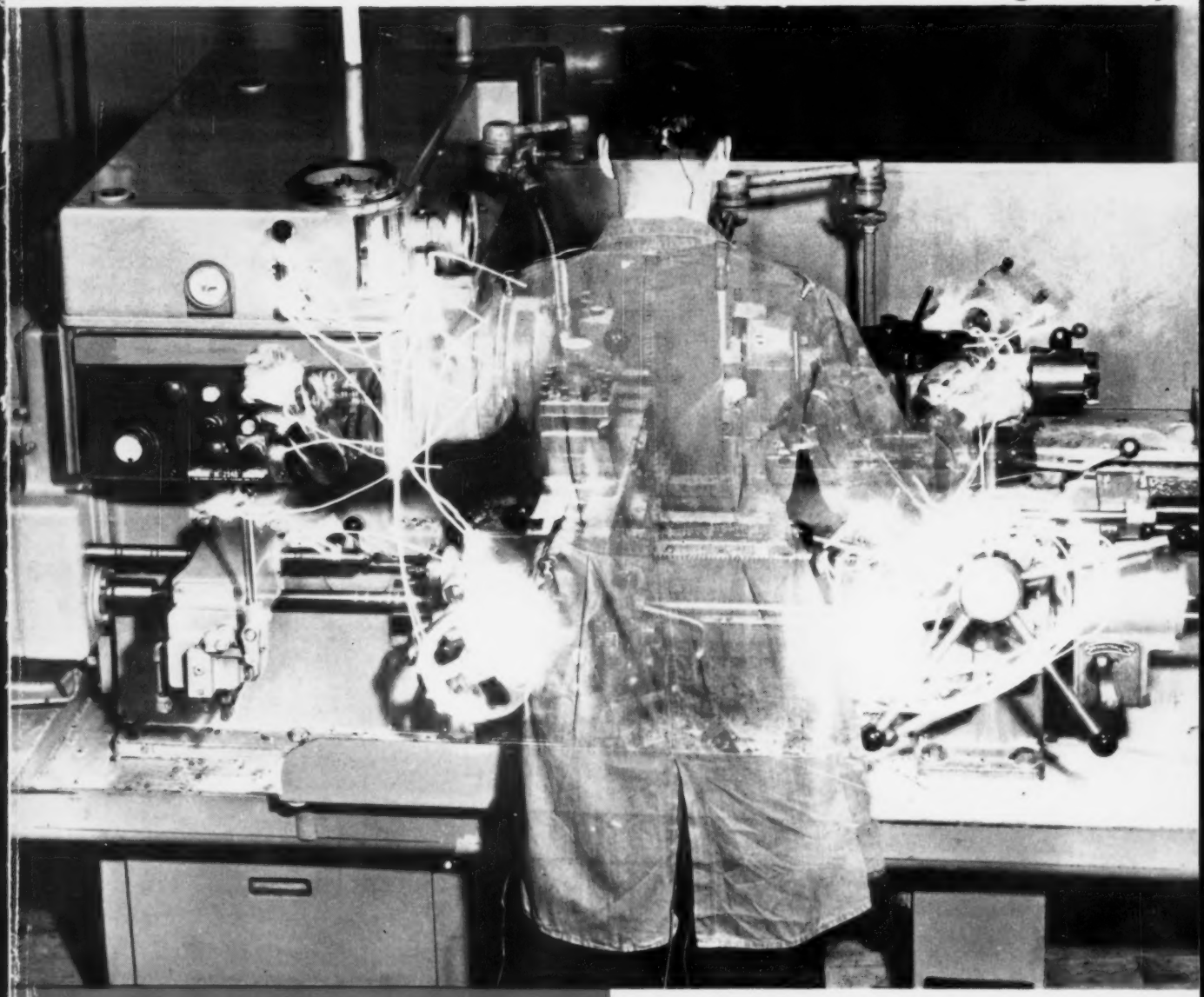
The IRON AGE
June 13, 1957
The National Metalworking Weekly



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Ultrasonics: From Metals To Dishwashers – P. 83

Now's the Time To Buy Industrial Motors – P.172

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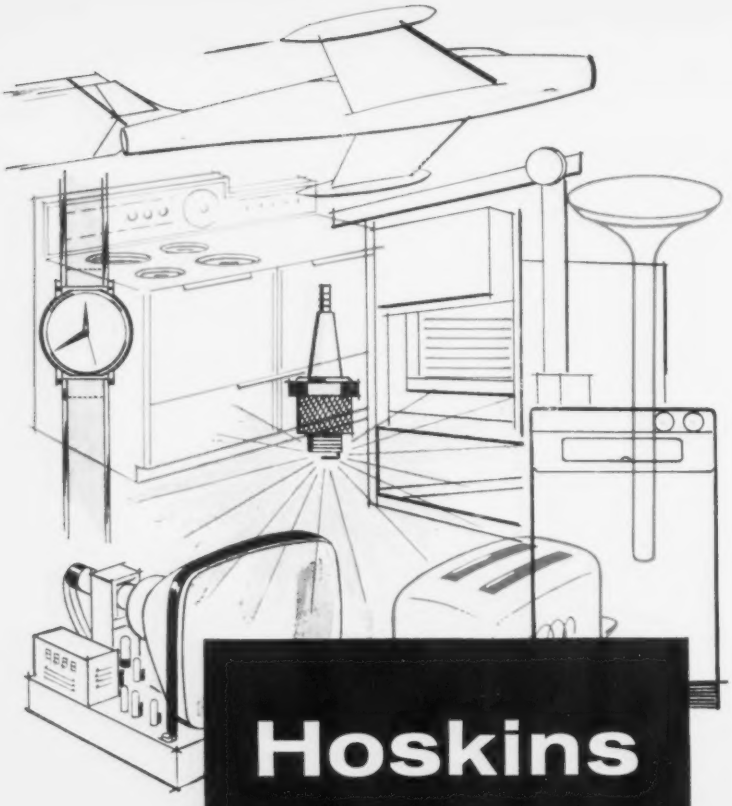

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CHROMEL-A is the original 80-20 nickel-chromium heating element alloy. Unequalled for durability and uniformity of resistance, it gives dependable top performance in electric ranges, furnaces and many other devices requiring heating units capable of operating at high temperatures under adverse conditions.

CHROMEL-ALUMEL thermocouple alloys possess finer accuracy and greater durability than any other known base metal materials. Made exclusively by Hoskins, they are the accepted standards for controlling heat treating operations up to 2300° F. and measuring exhaust temperatures of jet aircraft engines.

COPEL is a fine copper-nickel alloy which delivers superior performance on a wide range of "cold" resistor applications. Its controlled low coefficient of resistance, mechanical stability and high corrosion resistant properties recommend its use in precision instruments and many types of electronic devices.

ALLOY "502" is one of several special mechanical-purpose alloys developed and produced by Hoskins for diversified applications. Highly resistant to heat and corrosion, it is used with outstanding results as structural members for industrial furnaces, enameling hooks, heat treat fixtures, wire cloth, etc.

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DEVELOPING and producing custom quality alloys is a specialty at Hoskins. And it has been for nearly fifty years. Some, like Chromel, have been responsible for the birth and growth of entire industries. Others, like Copel, were developed to permit continued improvement in the design and operation of countless different end-products. Regardless of their application, however, each in its particular field is unsurpassed for durability, performance and dependability in service. And each is the result of specialized research activity devoted to the development of new and finer alloys to help make your products better.

Want more detailed information on Hoskins alloys, facilities and services? It's yours for the asking without obligation.

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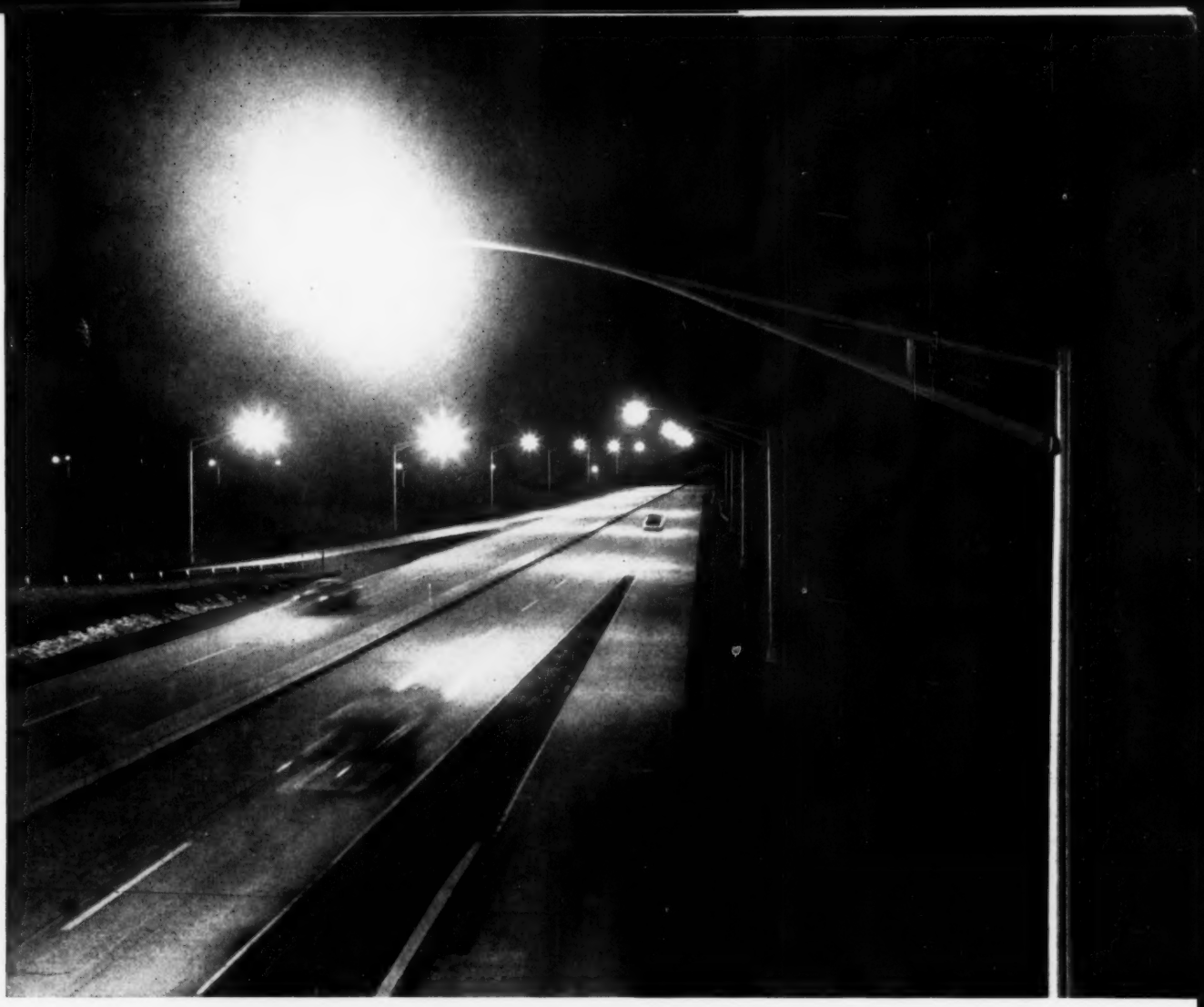
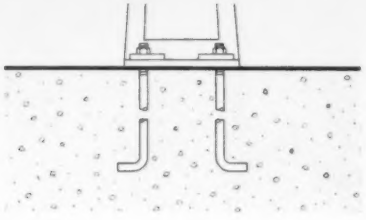


Where Do All the Anchor Bolts Go?

Something the motorist never sees, and hardly ever thinks about, are the long hook bolts which, in their unobtrusive way, anchor the electric light standards found along boulevards and highways. The bolts, generally used in groups of four, are embedded in concrete, where they provide adequate anchorage indefinitely.

Nor are hook anchor bolts limited to this one use. They also anchor transmission towers and bridges, and support signs at service stations and parking areas; they fasten structural steel to concrete foundations, and machinery to factory floors. We turn them out in a wide range of styles: all diameters from $\frac{1}{4}$ in. to 4 in., and in almost any length.

A highly specialized product, Bethlehem hook anchor bolts are representative of the ability of our fastener plant at Lebanon, Pa., to produce just about any type of headed or threaded fastener imaginable. Our fasteners engineers have a vast backlog of experience in handling the unusual in fastener problems—that's why they are frequently able to come up with solutions which add up to a saving for the user.



If you have a fastener problem which has been causing difficulty, we suggest you put it up to our fasteners engineers. Just drop a line to the nearest Bethlehem sales office.

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Indexed in the Industrial Arts Index and the Engineering Index.

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The Iron Age, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post office at Philadelphia under the act of March 3, 1879. Price to the metal-working industries only or to people actively employed therein, $2 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single copies 50¢. Annual Review Issue, $2.00. Cable: "Ironage," N. Y.

The IRON AGE

JUNE 13, 1957—Vol. 179, No. 24

Digest of the Week in

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Versatility Widens Ultrasonics' Role

Ultrasonics is a comparatively new development in metalworking. But it's also one of the fastest growing. A long list of successful developments and a look at the future show why its use will grow tenfold. **P. 83**

Will Lower Prices Offset Titanium Cutbacks?

Titanium faces the toughest crisis in its brief but spectacular ca-

reer. Cutbacks in Air Force buying are putting the brake on rolling mill schedules. **P. 88**

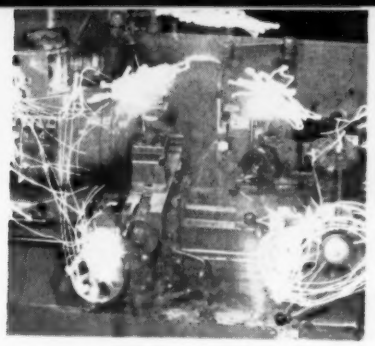
Air Force Cuts May Not Be Serious

Recent directives aimed at the Air Force threaten to curtail future spending. But it may not be as serious as it sounds. Present rate of spending should be nearly maintained. **P. 90**

New Policy Aids Small Business

A new Defense Dept. policy re-

Metalworking



ERGONOMICS GUIDE: Those weird-looking lines you see on the cover aren't flaws in the photo. They show body motions of a man operating a Warner & Swasey machine. They point up ergonomics' dimensions. **P. 123**

quires that a share of multiple award contracts be set aside for small business. A gain of several percentage points in the number of awards is foreseen. **P. 105**

Gas Turbine Engine To Compete Soon

General Motors engineers report their gas turbine engine is nearly ready to compete with piston engines. But only in certain commercial and military vehicles. They offer bigger payload capacity. **P. 100**

FEATURE ARTICLES

Colloid Lubricant Eases Machining of Magnesium

The building of the earth satellite turns up new machining techniques. Colloid dispersion is the answer where close dimensions are held in deep-drawing magnesium sphere. It prevents scoring of surface and insures clean separation from dies. **P. 127**

Modernization: How Much Makes It Pay?

One company that today is on a sound footing only a few years ago was struggling to keep alive. A good modernization plan plus a sound management points out how modernization can pay off. **P. 128**

Dry Process Prints Drawings From Film

New dry printer makes it possible to produce full size drawings from microfilm mounted on Filmsort card. High speed and low expense of process means that drawings are expendable. **P. 130**

Stainless or Tool Steel For High-Temperature Use?

Comparison of stainless and tool steel under high-temperature stresses forms a basic study of this vital subject. Where attention is focussed on the thermal barrier in flight, other fields are concerned, particularly turbines. **P. 132**

Match Drive and Bearing Seals To Service Conditions

Clearance seals are the simplest way to prevent bearings or gears from being struck by solid material. They are frictionless and work well despite shaft surface flaws. **P. 136**

MARKETS & PRICES

Should You Make It Or Buy It?

General Electric is setting up a special, company-wide, make-or-buy policy. Most companies faced with similar problems contrast costs. All variable factors must be considered, but there are systems for doing this. **P. 86**

New Oxygen Plant May Lift Ferromanganese Output

Production from new facility at U. S. Steel's Duquesne Works may increase ferromanganese output by 25 pct. **P. 91**

Steel Container Sales Continue High

With chemical users offsetting the steel container industry's loss of petroleum sales in '56 a new production record was hung up. And despite a battle with rising costs, continued market growth is expected by the manufacturers. **P. 92**

Can Your Firm Produce Weapons?

In an emergency, government procurement agencies must act fast. To prevent fumbling, the Armed Forces have devised a Production Allocation Program, and are inviting firms to get on list. **P. 109**

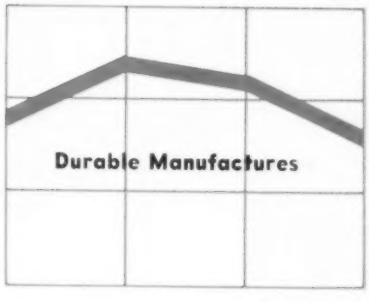
Have Steel Inventory Cuts Run Their Course?

Some steel men say inventory cuts will plague industry for rest of the year. Dismal July outlook is pointed to as proof. **P. 171**

NEXT WEEK

Metalworking's Pulse: Where Are We Headed?

IRON AGE editors have made a top-to-bottom check on metalworking: How's business today and what's the outlook for last half? The survey will help you make important decisions in months to come.



COLD-DRAWN TUBES AND BETTER FINISHES

One of the many reasons why tubing is cold drawn is to obtain a better surface finish than it is possible to achieve as a hot finished tube. In the finishing of tubing by the cold draw process, any imperfection of the die or the mandrel is reflected in the product. Pick up on the mandrel, for example, can mar the inside surface of the tube.

Louis Friedel operates one of the many cold draw benches at B&W. Between every draw, his practiced eye makes sure his mandrel and die are in perfect condition. Years of experience in watching and making thousands of feet of B&W Cold Drawn Tubing enables him to exercise that judgment needed to tell what meets B&W's quality standards.

Many other men like Louis Friedel, generations of experience armed with the best equipment, put their knowledge into every foot of B&W Tubing. It's your assurance that the B&W Tubing you buy will meet your most exacting requirements. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

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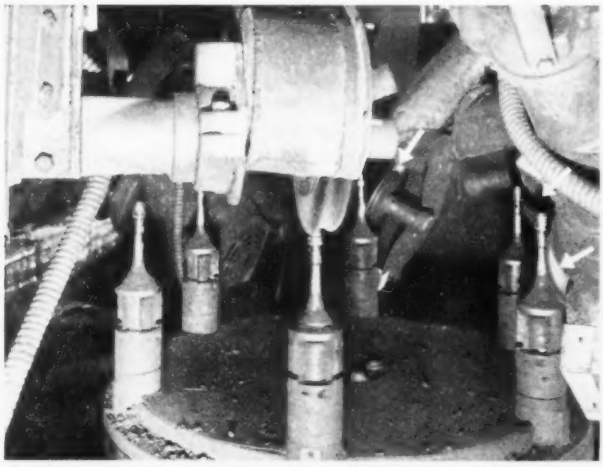

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STAINLESS DIRECTORY

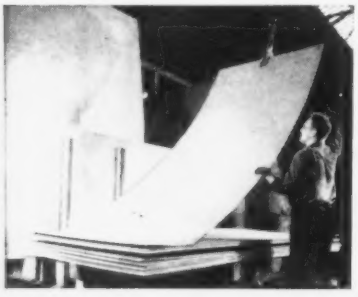
Buyers Guide to Ryerson Stainless Stocks & Services

Here's a quick guide to the nation's largest stocks of stainless steel—2,351 sizes, shapes, types and finishes of Allegheny stainless in stock at Ryerson.

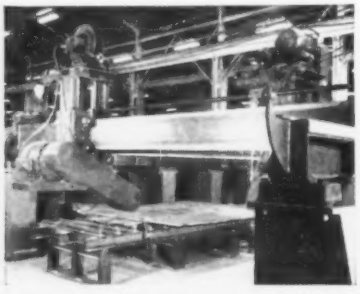
This wide selection assures you of getting the best stainless for every application. Extra care in storage, handling and shipping—such as padded shear clamps to protect finish and flatness of sheets—guards the high quality of Ryerson stainless stocks. And in addition, the help of full-time stainless specialists is yours when you call Ryerson.

See your Ryerson catalog for a complete listing of stocks and call your nearby Ryerson plant for quick shipment of Allegheny stainless—one piece or a truckload.

SHEETS—11 analyses of Allegheny stainless sheets in stock including nickel and straight chrome types. Also extra wide sheets to reduce welding costs.



PLATES—Available in 9 analyses including plates to Atomic Energy Commission requirements and to ASTM specifications for code work. Also extra low carbon types for trouble-free welding.



TRUE-SQUARE ABRASIVE CUTTING
Stainless plates up to 12' x 25' cut absolutely square on abrasive disc machine. Length and width tolerance plus or minus 1/32".

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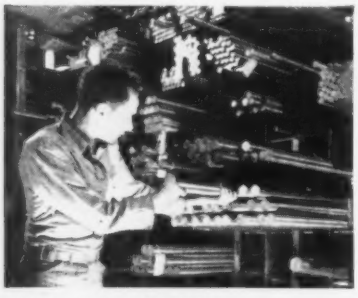

BARS AND ANGLES—Rounds, squares, flats, hex's and angles in 8 types including free-machining bars with both analysis and mechanical properties controlled for best performance.

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AIRCRAFT STAINLESS—Sheets, strip, plate and bars to Government and Aeronautical Specs. Write for Ryerson Aircraft Steels booklet.

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The Dangerous Age
We Are Deep In It Now

The Reds have set a mammoth propaganda trap for us. We "people at home" are almost forcing the President to fall for the "bait".

The drive for less spending and the tampering with the defense budget are related to the trap. So too is that wistful feeling that all is well and that we can hide our heads in the sand.

This feeling among most of us about the budget and about inflation comes just at the time when the Reds are trying to spring their trap. They may have us in it already.

If you were one who saw and listened to Comrade Khrushchev on the CBS telecast a week ago last Sunday you must have blanched. If you saw and heard this two-faced liar then you know what America is in for if we ever let down.

CBS did us a favor by televising the Arch Prevaricator of all times. This is the man who has the audacity and effrontery to suggest that we are planning a war against the Russians.

That is but a mere by-play of what the Reds have in store for us. First we must be taken in by phony disarmament "agreements" if they can get them. Then we are to be softened up economically so that we will fall apart—they hope.

Already throughout the land many newspapers and too many people have taken new hope that the Reds may have changed. Men are asking each other if this isn't the time to make overtures, the time to turn the other cheek. The time to go half way.

Perhaps it is time to go half way. But before we go half way let's make up our minds once and for all that we are NOT dealing with normal human beings when we bargain with the Reds. If we ever forget that then God help us because we will not be able to do much ourselves.

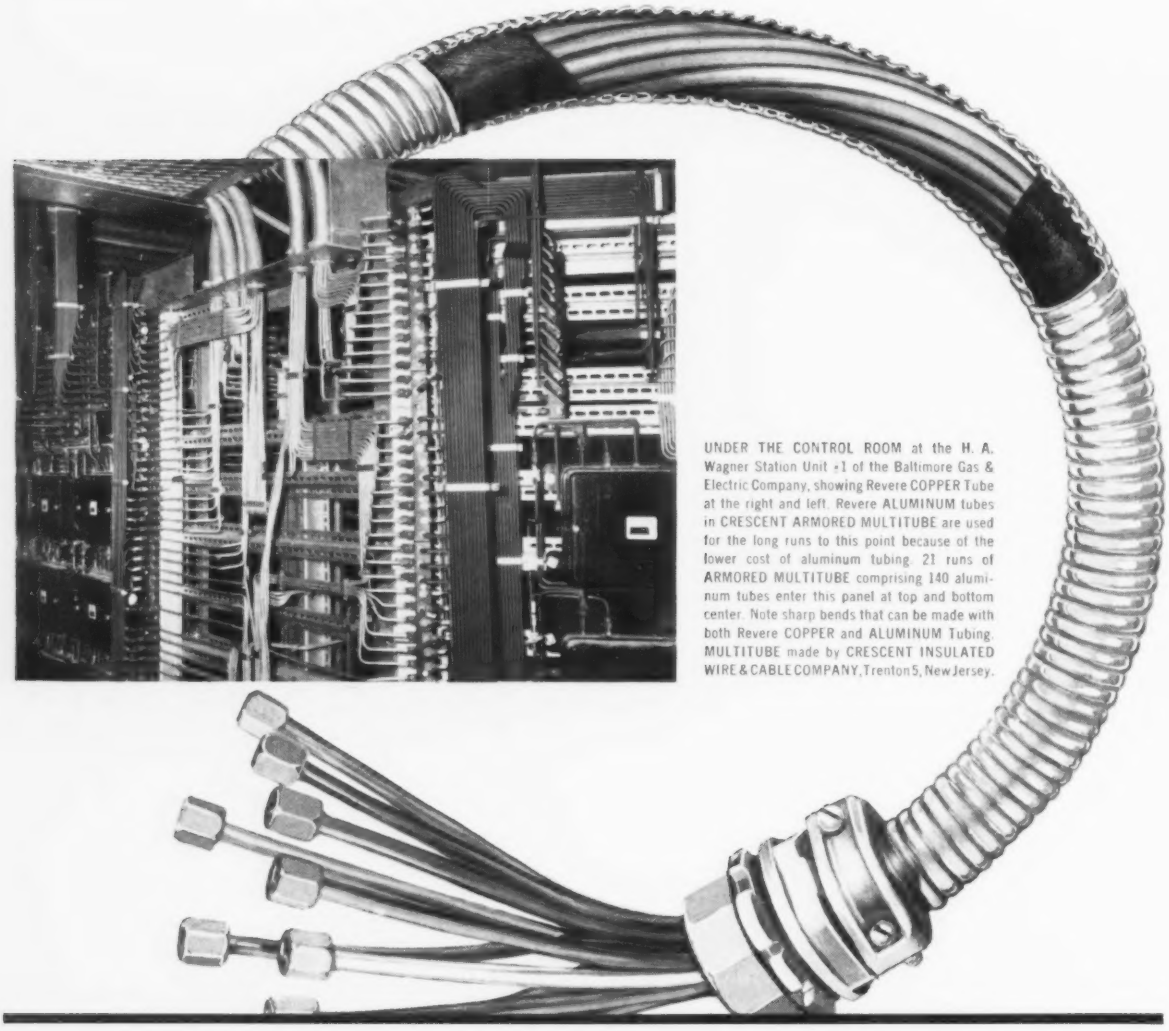
This enthusiastic talk of peace, less defense, fraternization, co-existence—or whatever else you call it, is made to order for the Reds. They love it. It gives them the chance to get what they want—while we assume that they think, act and feel as we do.

Well don't kid yourself. And don't let your elected representative kid himself that we can have peace and honest dealings with the Reds. When we deal let's keep the gun on the table. Let's assume we have to watch every move they make. Let's believe that they are out to get us no matter what happens.

If you don't believe we must be strong, daring, prepared and worthy of sacrifice, ask some of the 900 million people who are ground under the heel of Communism. They know—too late.

Tom Campbell

Editor-in-Chief



UNDER THE CONTROL ROOM at the H. A. Wagner Station Unit #1 of the Baltimore Gas & Electric Company, showing Revere COPPER Tube at the right and left. Revere ALUMINUM tubes in CRESCENT ARMORED MULTITUBE are used for the long runs to this point because of the lower cost of aluminum tubing. 21 runs of ARMORED MULTITUBE comprising 140 aluminum tubes enter this panel at top and bottom center. Note sharp bends that can be made with both Revere COPPER and ALUMINUM Tubing. MULTITUBE made by CRESCENT INSULATED WIRE & CABLE COMPANY, Trenton 5, New Jersey.

CRESCENT relies on REVERE

for dependable performance of its instrumentation and control tubing

REPORTS, "NOT ONE FAILURE."

The dependable performance of Revere Copper Tube in Crescent Armored Multitube*, ever since its inception, has led the CRESCENT INSULATED WIRE & CABLE COMPANY to fill its aluminum tube needs with Revere also.

In fact, Crescent, since it first started using Revere Copper Tube in 1953, reports not a single failure. And that's mighty important in instrumentation and control tubing service where utilities, chemical processing, petroleum, paper and similar industries can't afford the luxury of process failures.

Crescent Multitube, using either Revere Copper or Aluminum Tube, or both in combination, offers a completely protected installation for permanence, lower original installation cost, lower maintenance and a saving of time, space and money.

Crescent Armored Multitube consists of a group of Revere Copper or Aluminum Tubes, twisted together in cable form, protected by a flexible interlocked galvanized steel armor. Constructions are available employing plastic sheaths in combination with the armor for corrosive locations. Section of cabled tube pictured shows how Copper or Aluminum Tubes are encased inside the Armored Multitube. As many as 37 tubes of ¼" OD can be cabled in lengths up to 1,000 ft.

For details on Multitube write Crescent and for uniform quality copper and aluminum tube, speedily delivered, see the nearest Revere Sales Office.

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Gets Help

Sir—Please accept my due thanks for publishing my recent letter.

I have just received a letter from one of the readers of THE IRON AGE, Mr. A. J. Hofmann of A. Jay Hofmann Co., Narberth, Pa. He came across my letter in the May 16 issue, and decided to give me the opportunity of earning money by selling some of his machinery and plant equipment, here in the Philippines. This will be used to advance my education in metallurgy.—Antonio G. Fernandez, 96 N. Domingo St., San Juan, Rizal, Philippines.

Aluminum Dollar

Sir—In a fairly recent issue (Jan. 31, I believe) there appeared in THE IRON AGE, a special article entitled "How to Get More for Your Aluminum Dollar" which was No. 7 of a series.

I was very impressed at the amount of technical data and the very intelligent presentation of the subject matter and would like to receive a tearsheet copy. If possible, and available, I would appreciate all seven of the special articles in this series.

Would you please send me reprints of these seven special articles?—J. J. Schmidt, Time Standards Engr., Remington Rand Univac, Div. of Sperry Rand Corp., St. Paul, Minn.

Stamping Dollar

Sir—In the May 30 issue you ran a feature article, "How to Get More for Your Stamping Dollar." The article was found to be accurate and informative.

I would appreciate receiving 12 copies for distribution internally and with our sales people as soon as possible.—C. H. Judd, Pres., Judd Industries, Inc., Cleveland, Ohio.

Sir—As offered in the May 30 issue of THE IRON AGE, will you please send us a dozen reprints of the article, "How to Get More for Your Stamping Dollar."—H. K. Gessner, Vice Pres. & Treasurer, Columbia Steel Equipment Co., Fort Washington, Pa.

▪ Copies are on the way.—Ed.

Guided Missiles

Sir—Please mail to the attention of the writer two reprints of the Special Report article, "Will Guided Missiles Blast Aircraft Industry's Plans?" which appeared in the May 30 issue.—R. E. Holmes, Purchasing Agent, Pressed Steel Tank Co., Milwaukee, Wis.

Centralized Lubrication

Sir—Would it be possible for you to furnish 15 copies of the April 11 article, "Force High Overhead Costs Down With Centralized Lubrication"?

We believe this information will be of value to a certain group of our sales force, and will appreciate your accommodating our request.—T. F. Eichstaedt, Asst. Mgr., Machinery & Tool Div., Joseph T. Ryerson & Son, Inc., Chicago, Ill.

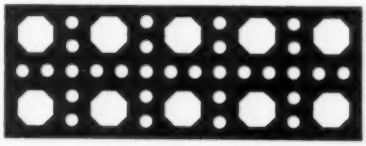
"The office I'm giving you is so big I'll have to put eight others in with you."

DIAMOND PERFORATED METALS

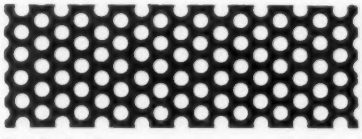
FOLLOW THE TREND

toward development of more attractive products through the greater use of DIAMOND ORNAMENTAL PERFORATED METALS.

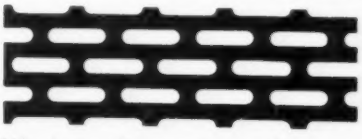
Perforated-Metal Sections supplied by Diamond to other manufacturers include **Grilles** and **Louvers**, for air conditioners, radios, juke boxes, television sets, automobile instruments, etc. Furnished also, for many modern products in **Rigidized Perforated Metal.**



Screens, for industrial processing, sterilizers, etc.; **Panels**, for space heaters, etc.; **Oil-Burner Chimneys; Perforated Cylinders**, for washing-machine and other centrifugal dryers; **Accoustical Sheet; Sound Baffles; Welded and Fabricated Assemblies** of all kinds.



Tooled for a great variety of perforations in any commercial metal, of any suitable thickness. **Geared** to meet the production schedules of America's leading industrial concerns—that's Diamond.



Want to know more about us and what we might do for you? Write for Catalogue No. 39.

DIAMOND MANUFACTURING CO.
Box 41 WYOMING (Wilkes-Barre Area) PENNA.

West Coast Plant, Diamond Perforated Metals Co.
17915 So. Figueroa St., Gardena, Calif.
Los Angeles Area

®Traveloader ...unloads 8 cars per day

...former method 1 car per day!

Auto frames arrive at this assembly plant on flat cars—120 frames per car (6 stacks of 20 frames). Traveloader, the unique Baker side-loading fork truck, handling 20 frames at a time, unloads, transports and stacks them in the storage area at the rate of one car every 30 minutes. Thus 6 carloads—sometimes 8—are handled in less than a day with the Traveloader and one operator.

A former method, using a fork truck, required two men plus the truck and driver to do the job—and one carload per day was the limit of the crew. The capacity of the truck was 6 frames per load. Cars, waiting to be unloaded, piled up on the tracks and demurrage charges resulted.

Besides unloading the frames, the Traveloader has time for many other handling jobs. If you have a difficult handling problem involving big, awkward or long loads, let us help you solve it with Traveloader. Write for Bulletin 1360.

Baker®
industrial trucks

THE BAKER-RAULANG COMPANY
1227 WEST 80th STREET • CLEVELAND 2, OHIO

A Subsidiary of the Otis Elevator Company

7T5

For Purchasers

In this week's issue we unveil our new page for purchasing agents (see page 172). In this particular case, it's made to order for the buyer of industrial motors. It gives him a rundown on market conditions, new developments, and indicates that now is as good a time as any to buy. In future issues we'll talk about fasteners, abrasives, castings—and the many other components and materials that busy metalworking buyers must keep on top of.

Prize Winner

The editors were pretty sure they had something good going for you the readers when they started the Metalworking Dollar Series last year.

So they were quite happy to learn the article won a first prize in Industrial Marketing Magazine's Annual Business Paper Achievement Contest. The award was presented June 10 at the National Industrial Advertisers' Assoc. annual meeting in New York.

Officially, the IM award was for the best series of articles published during 1956. Iron Age's "How To Get More For Your Metalworking Dollar" was one of five first-prize winners awarded among a record 653 entries.

The 1956 series consisted of six articles offering dollar-saving guides to metalworking processes and materials. Each article covered a basic metalworking area—Stainless Steel, Tooling, Material Handling, Plating, Welding and Inspection.

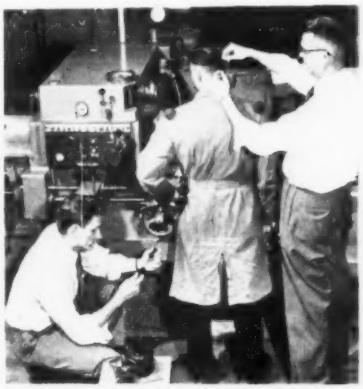
The award adds professional recognition to the stamp of approval already put on the series by the readers—2,672 of them wrote in for reprints totalling 16,721.

The Dollar series is a full staff job, each subject being handled by different editors. So far this year the 1957 series has covered Aluminum, Organic Finishing, and Stamping—and there's more to come.

Candid Camera

The shutter bugs among us can tell right off how this week's cover picture was taken. But for the uninitiated (like us), we think a word or two is in order.

The photo below shows some folks at Warner & Swasey rigging one of their machine operators with



lights on wrists, shoulders, head, etc.

The light traces are made by photographing the operator (with body lights glowing) in motion in a darkened room. The camera shutter is left open. Then, when enough traces are taken, a flash bulb goes off and the operator and machine are photographed over the traces.

The story, on how Warner & Swasey applies ergonomics starts on p. 123.

Puzzlers

We say that if it takes a half a hen 1½ days to lay a half of an egg, 1 hen 1½ days to lay 1 egg, then it will also take 13 hens 1½ days to lay 13 eggs. Charles Pipenhagen, Jr., Chicago; Wilbur L. Baker, Nashville, Tenn.; D. M. Estner, Western Electric Co., Omaha; L. W. Hennings, Jr., Louisville, Ky.; and Letterman, Berry and Charlsie, General Steel Castings Corp., Granite City, Ill., say the same.

YOUR ORDER FOR

POUND... OR

will be consistently uniform in dimensions and engineering properties if it's - - -

PENNROLD
precision strip

Beryllium Copper
Phosphor Bronze
Nickel Silver
Brass
Chromium Copper
Stainless
(incl. 17-7 P H)
Invar
Nickel Iron Alloys

0.0005 in. to 0.040 in. thick
0.090 in. to 6 in. wide

Some immediately available. Others rolled to order in 2 to 21 days. Can be supplied in coils or straight lengths with slit or filed edges — also cadmium plated.

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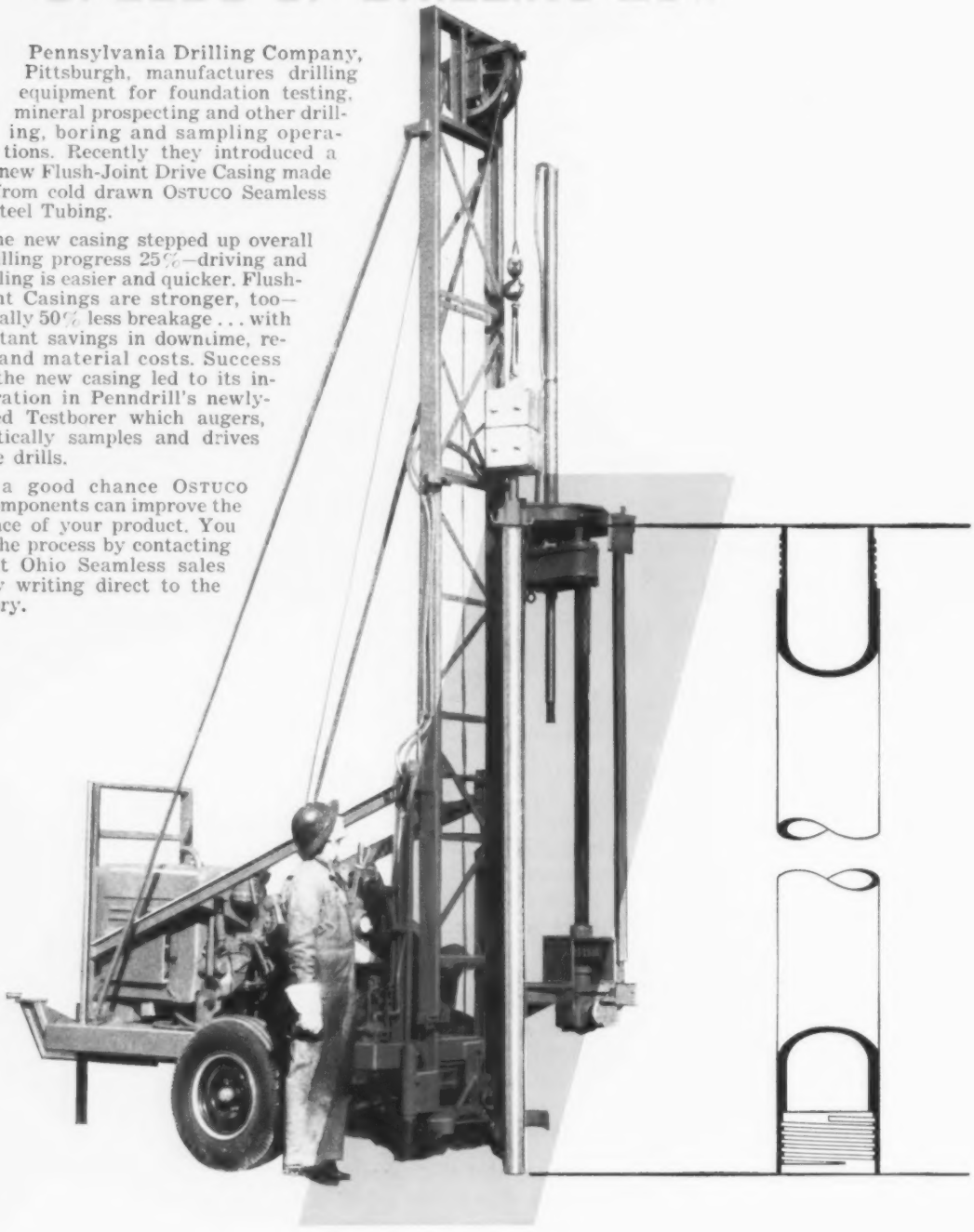
OHIO SEAMLESS TUBING

SPEEDS UP DRILLING 25%

Pennsylvania Drilling Company, Pittsburgh, manufactures drilling equipment for foundation testing, mineral prospecting and other drilling, boring and sampling operations. Recently they introduced a new Flush-Joint Drive Casing made from cold drawn OSTUCO Seamless Steel Tubing.

The new casing stepped up overall drilling progress 25%—driving and pulling is easier and quicker. Flush-Joint Casings are stronger, too—actually 50% less breakage . . . with resultant savings in downtime, repair and material costs. Success with the new casing led to its incorporation in Penndrill's newly-designed Testborer which augers, automatically samples and drives and core drills.

There's a good chance OSTUCO Tubing components can improve the performance of your product. You can start the process by contacting the nearest Ohio Seamless sales office, or by writing direct to the Shelby factory.



OSTUCO SHELBY, OHIO

OSTUCO TUBING

MANUFACTURED IN SHELBY, OHIO

EXCLUSIVELY BY

OHIO SEAMLESS TUBE DIVISION

OF COPPERWELD STEEL COMPANY

SHELBY, OHIO • Birthplace of the Seamless Steel Tube Industry in America

SEAMLESS AND ELECTRIC-RESISTANCE WELDED STEEL TUBING • FABRICATING • FORGING

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CANADA: Railway & Power Engr. Corp., Ltd.

EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY, 225 Broadway, New York 7, New York

EXHIBITS, MEETINGS

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22.)

Metal Show — Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

JUNE

Assn. of Steel Distributors, Inc.—Steel distribution seminar, June 14-17, Michigan State University, Lansing, Mich. Society headquarters, 29 Broadway, New York.

National Assn. of Metal Finishers—Annual meeting, June 16-17, Sheraton-Mt. Royal Hotel, Montreal, Que. Society headquarters, 60 Bently Rd., Cedar Grove, N. J.

American Electroplaters Society — Annual meeting, June 16-21, Sheraton-Mt. Royal Hotel, Montreal, Que. Society headquarters, 445 Broad St., Newark 2, N. J.

American Society for Testing Materials—Annual meeting with sessions on varied fields of materials technology, June 17-21, Chalfonte-Haddon Hall, Atlantic City. Society headquarters, 1916 Race St., Philadelphia.

American Marketing Assn. — Annual meeting and exhibit, June 19-21, Hotel Statler, Detroit. Society headquarters, 27 E. Monroe St., Chicago.

Drop Forging Assn. — Annual meeting, June 19-22, Grand Hotel, Mackinac Island, Mich. Society headquarters, 419 S. Walnut St., Lansing, Mich.

American Institute of Chemical Engineers — 50th anniversary meeting, June 22-27, Bellevue-Stratford Hotel, Philadelphia. Society headquarters, 25 W. 45th St., New York.

Alloy Casting Institute — Annual meeting, June 23-25. The Homestead, Hot Springs, Va. Society

(Continued on P. 16)

"MACHINERY ANALYZER saves us $1000 per hour..."

"We've had total savings of more than $100,000 since we purchased the analyzer three years ago. The analyzer has been shipped over 100,000 miles by air, rail, and car to our eight plants without need for repairs or replacements" — reports a leading chemical processor.

The Machinery Analyzer — actually a portable IRD Vibration Analyzer — is used for . . .

- TROUBLE-SHOOTING — to pinpoint faulty components exciting vibration *without costly dismantling.*
- MEASURING DISPLACEMENT — to accurately determine the condition of machinery *without costly dismantling.*
- IN-PLACE BALANCING — to dynamically balance at operating speed the accessible rotating components *without costly dismantling.*

Here are several examples cited by company officials:

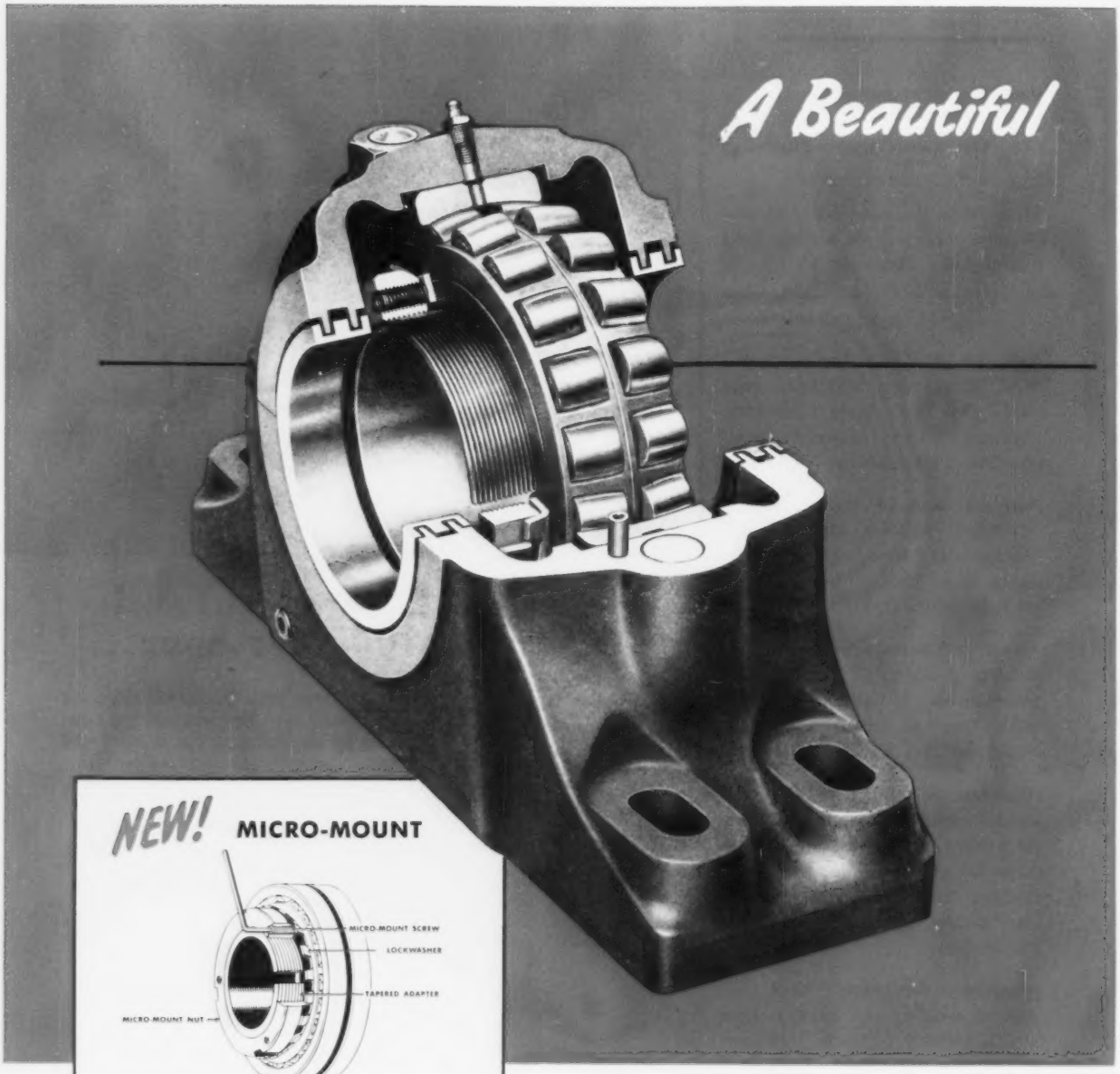
- Detecting a broken gear in an important gear reducer saved a major loss of production.
- Savings of $2000 in balancing a ringer assembly because dismantling and loss of production were eliminated.
- A 450 HP motor was balanced, in place, at savings of $8000 to $10,000 in production and maintenance costs.

What portable IRD Vibration Analyzers are doing for this company — to reduce inspection, maintenance, and production costs — it can do for your company.

IRD

For further information — or an actual demonstration on your own machinery by an IRD field engineer — write today to International Research and Development Corporation, 797-1A Thomas Lane, Columbus 16, Ohio.

A Beautiful



NEW! MICRO-MOUNT

Fast and accurate mounting is made possible by the new Dodge Micro-Mount. The Adapter is snugged up with the Micro-Mount Nut. Mounting is completed by turning the Micro-Mount Screws against the Lockwasher until bearing, adapter and shaft form an integral unit.

Now — a spherical roller bearing pillow block has been added to "America's most complete line of mounted bearings."

This new Dodge product possesses all the fine characteristics of the spherical type, plus the precision, dependability and refinements you would expect from the nation's leading supplier of mounted bearings.

Rugged housing of close-grained semisteel, in compact modern design, withstands shock loads. The new Micro-Mount Adapter seats Spher-Align solidly on shaft, *with amazing ease and speed.* A new feature of bearing design allows lubricant to enter at center of bearing and move outwardly along all bearing surfaces. Convenient drain plugs permit use of either grease or oil and provide for easy flushing. Triple seals retain lubricant.

Standardized dimensions make Spher-Align interchangeable with all other similar units. Available in expansion and non-expansion types. In stock for 2 7/16" to 8" shafts. Call your Dodge Transmissioneer — or write us.

DODGE MANUFACTURING CORPORATION • 800 UNION ST., MISHAWAKA, INDIANA

New Bearing by Dodge —

Spher-Align

ANNOUNCING AMERICA'S NEWEST SPHERICAL ROLLER BEARING PILLOW BLOCK ... A RUGGED BEARING IN ATTRACTIVE MODERN DESIGN ... INHERENTLY SELF-ALIGNING ... EASY TO INSTALL ... EASY TO MAINTAIN ... AND FEATURING THE UNIQUE MICRO-MOUNT ADAPTER

AMERICA'S MOST COMPLETE LINE OF MOUNTED BEARINGS

DODGE-TIMKEN
Tapered Roller

SPHER-ALIGN
Spherical Roller

SC, SCM, SL
Ball

SLEEVOIL
Precision Ring Oiling

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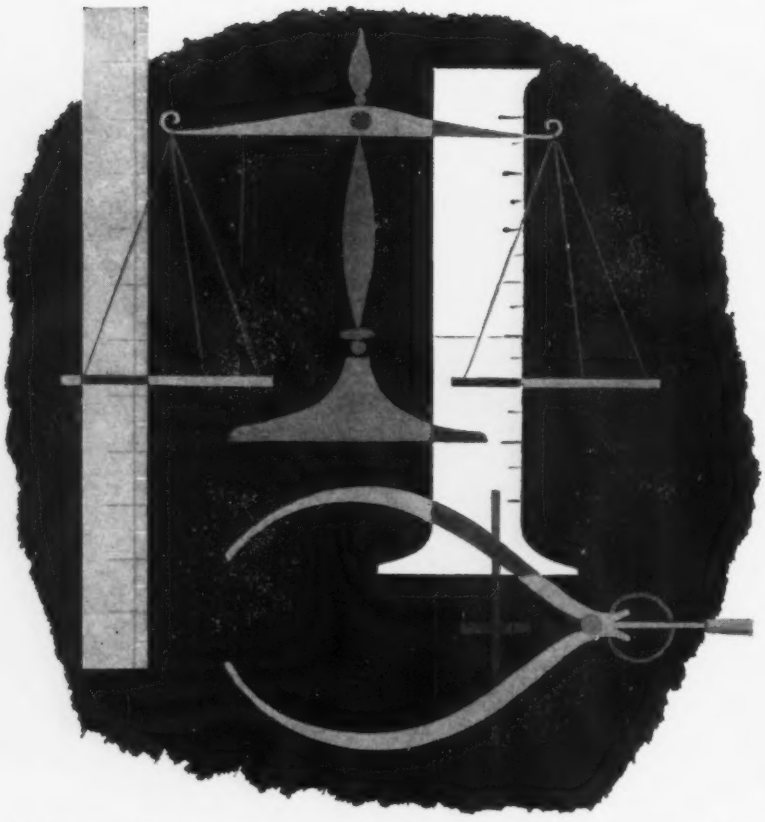
Capillary Oiling

BABBITTED
Solid and Split

PILLOW BLOCKS • HANGER BEARINGS
FLANGE BEARINGS • UNIT MOUNTS • TAKE-UPS

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in the yellow pages of your telephone directory — or write us.



how do you measure economy?

economy is not measured by price alone!

PROVED OVER THE YEARS

When you are concerned with metal abrasives there are many yardsticks that must be applied to truly measure economy.

How long will an abrasive last? How long before it breaks down into fines and becomes inefficient?

How destructive is the abrasive to machinery and equipment?

How efficiently does it perform and what is the time cycle for good performance?

To sum it all up — the economy of using any abrasive can be measured by the **cost per ton of metal cleaned!**

On every count, Malleabrasive has proved its superiority over the years in hundreds of plants.

If you want to improve the economy of your blast cleaning operations — check Malleabrasive.

MALLEABRASIVE

THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO ®

1907—Fiftieth Anniversary—1957

EXHIBITS, MEETINGS

Continued from P. 13

headquarters, 32 Third Ave., Mineola, N. Y.

Wire Reinforcement Institute — Annual spring meeting, June 24-25, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 1049 National Press Bldg., Washington, D. C.

Concrete Reinforcing Steel Institute—Annual meeting, June 24-29, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters 38 S. Dearborn St., Chicago.

SEPTEMBER

American Mining Congress—Metal mining and industrial minerals convention, Sept. 9-11, Hotels Utah & Newhouse, Salt Lake City, Utah. Society headquarters, 1200 18th St., Washington, D. C.

Instrument Society of America — 12th annual instrument-automation conference and exhibit, Sept. 9-13, Cleveland Auditorium, Cleveland. Society headquarters, 313 Sixth Ave., Pittsburgh.

National Petroleum Assn.—Annual meeting, Sept. 11-13, Traymore Hotel, Atlantic City, Society headquarters, 958 Munsey Bdlg., Washington.

Marking Device Assn. — National meeting, Sept. 19-20, Roosevelt Hotel, New Orleans, Society headquarters, 912 Chicago Ave., Evanston, Ill.

Steel Founders' Society of America —Fall meeting, Sept. 23-24, The Homestead, Hot Springs, Va. Society headquarters, 606 Terminal Tower, Cleveland.

The American Society of Mechanical Engineers—Fall meeting, Sept. 23-25, Statler Hotel, Hartford, Conn. Society headquarters, 1010 Empire Bldg., Pittsburgh.

American Hot Dip Galvanizers Assn.—Semi-annual meeting, Sept. 26-27, Netherland-Hilton Hotel, Cincinnati. Society headquarters, 1806 First National Bank Bldg., Pittsburgh.

JALZINC is J&L's superior quality zinc coated steel

JalZinc is produced on this modern Sendzimir continuous galvanizing line. JalZinc has a tight, uniform coating that resists cracking and flaking. The uniform ductility, flatness and a high luster surface finish improve your product appearance.

JalZinc is available in a wide range of gages and widths in both cut lengths and coils. It can be furnished in coating weights from 1.00 oz. to 2.50 oz. per sq. ft., depending on your end product needs.

Get details from your local J&L district office or write to the Jones & Laughlin Steel Corporation, Dept. 518, 3 Gateway Center, Pittsburgh 30, Pa. For out of stock requirements, call your local steel warehouse or sheet metal distributor.

J&L STEEL

Jones & Laughlin

...a great name in steel

YOU CAN RESERVE AIR FREIGHT SPACE ON ANY FLIGHT IN THIS TIMETABLE

On United, you can reserve Air Freight space the same way you reserve passenger space—and on any of 900 daily flights!

The same United timetable you use to get places quickly and comfortably can be used to schedule large or small Air Freight shipments (from pounds to tons).

Air Freight moves on *all* United flights. And United will reserve space for your shipment on whatever flight you select.

This is called "Reserved Air Freight." It's United's way of handling Air Freight shipments with all the speed, frequency and schedule dependability of regular passenger service. In fact, United will even pick up and deliver your shipment.

To guarantee the space you need on the flight you want, you simply call United's local Air Freight office three hours or more before flight time. They'll clear and hold the space for you.

No other airline does so much to make shipping so fast, so easy, so dependable. And at rates you'll find pleasantly surprising.

Examples of United's Air Freight rates

	per 100 pounds*
CHICAGO to CLEVELAND	$4.78
NEW YORK to DETROIT	5.90
DENVER to OMAHA	6.42
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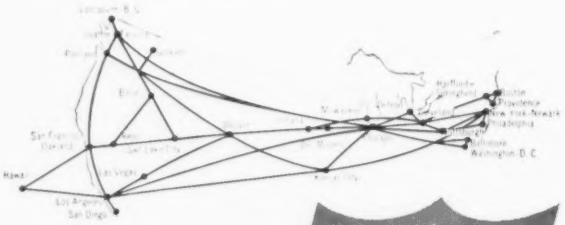
SAN FRANCISCO to BOSTON	27.00

*These are the rates for many commodities. They are often lower for larger shipments. Rates shown are for information only, are subject to change, and do not include the 3% federal tax on domestic shipments.

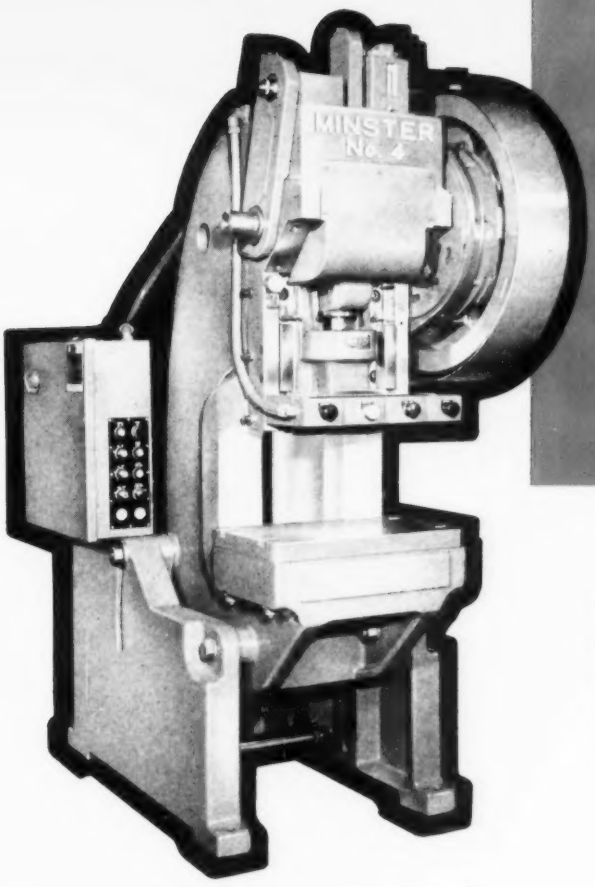


Door-to-door service

SHIP FAST... SHIP SURE... SHIP EASY

UNITED AIR LINES

For service, information, or free Air Freight booklet, call the nearest United Air Lines Representative or write Cargo Sales Division, United Air Lines, 36 South Wabash Avenue, Chicago 3, Illinois.



You Helped Design The Improved

MINSTER O.B.I.

You, as a press user, have often told us what features *you* wanted in an O.B.I. to improve *your* press operations. Most of the design changes in this improved Minster O.B.I. are based on *your* ideas, desires and demands.

CENTRALIZED CONTROL CABINET CONVENIENTLY LOCATED . . . NEVER INCLINES

For convenience and better operation, control cabinet mounted on leg remains vertical when press is inclined; is subject to less operational shock and easier to maintain.

NEW LEG DESIGN PROVIDES MORE WORKING SPACE

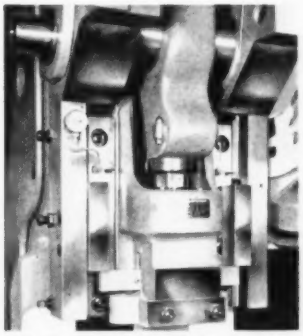
Square-cut legs give operator more room, a comfortable position in front of press. Inclining mechanism in leg and use of movable spacer rod provide more free space under press for tote pans or conveyors.

NUMBER	4	5	6
TONS CAPACITY	32	45	60

Flywheel or geared type. Drive can be mounted on either side. MINSTER patented Combination Air Friction Clutch and Brake Unit mounted within flywheel or drive gear on crankshaft.

HEAVIER FRAME FOR GREATER RIGIDITY, ACCURACY AND DIE LIFE

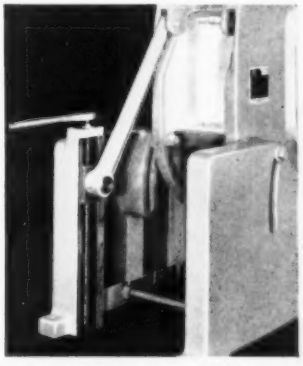
Frame closed in on top and front completely encloses bearing caps, thus providing better distribution of work forces. Connection cover keeps press cleaner—no oil drops hit operator.



GREATER CONNECTION STRENGTH — IMPROVED KNOCKOUT

Tail stock type connection screw locking. Increased connection strength and screw support.

T-Slotted Knockout blocks moving against frame surface give more positive knockout, are easier to adjust. No more bracket breakage.

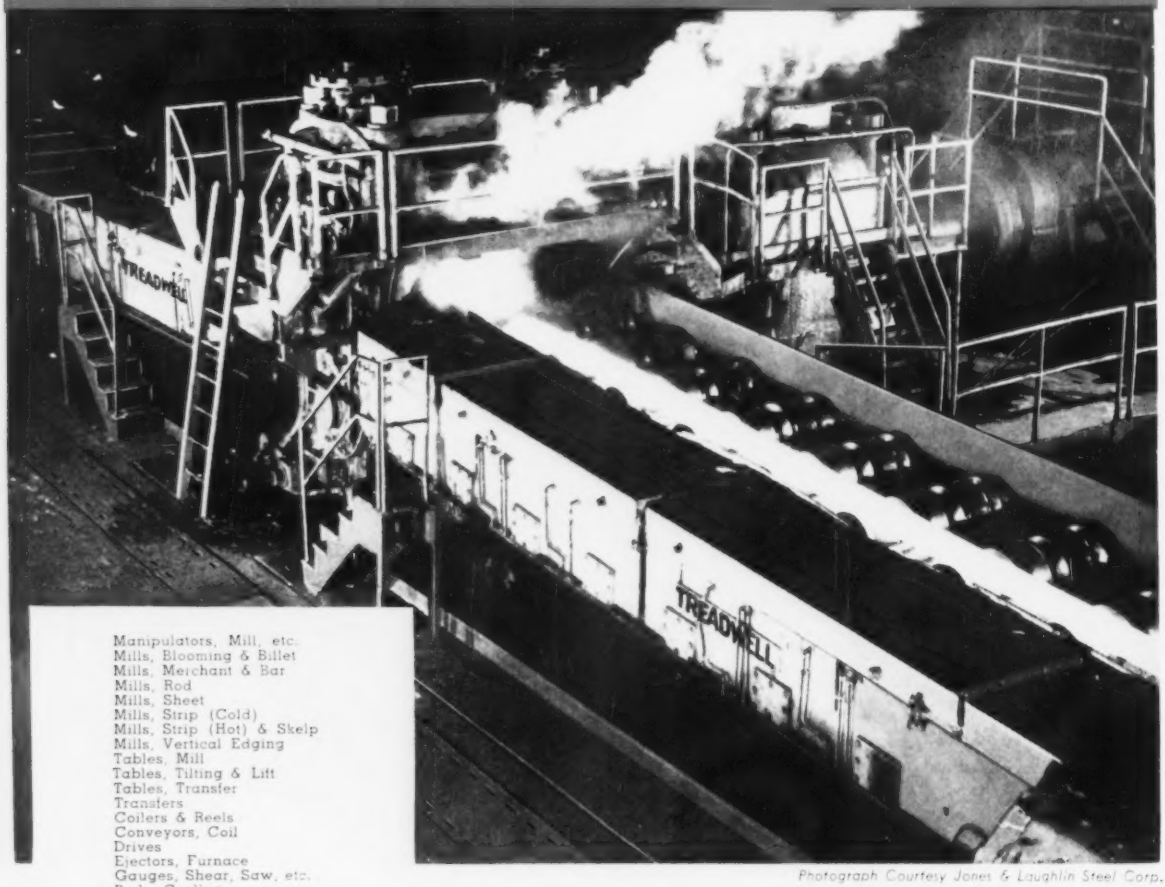


FASTER, EASIER INCLINING

Inclining the press takes less time and labor with ratchet-wrench-operated mechanism located in press leg *at normal working height*. Die changes are made quickly in vertical position with greater safety, more accurate alignment and less die change-over time.

THE MINSTER MACHINE COMPANY • MINSTER, OHIO

Treadwell



Photograph Courtesy Jones & Laughlin Steel Corp.

Manipulators, Mill, etc.
Mills, Blooming & Billet
Mills, Merchant & Bar
Mills, Rod
Mills, Sheet
Mills, Strip (Cold)
Mills, Strip (Hot) & Skelp
Mills, Vertical Edging
Tables, Mill
Tables, Tilting & Lift
Tables, Transfer
Transfers
Coilers & Reels
Conveyors, Coil
Drives
Ejectors, Furnace
Gauges, Shear, Saw, etc.
Beds, Cooling
Beds, Inspection
Bumpers, Furnace
Pushers, Furnace
Repeaters
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40' long 28" three-hi mill tilting tables for diamond and square pass rolling of bars, billets and blooms. Materials automatically manipulated from pass to pass with manipulators. Our Engineers will be glad to discuss your mill problems with you.

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NOW! USS Gerrard AUTOMATIC STRAPPING MACHINE

Fully Tested, Tried and Proven

FOR ADDITIONAL INFORMATION and a copy of our folder on this Model 12 Automatic Strapping Machine, fill in the convenient coupon.

Where automation is important to your packaging and bundling problems, the USS Gerrard Model 12 Automatic Round Steel Strapping Machine is the answer to your needs. This machine has thoroughly proved its efficiency and trouble-free operation. Here, briefly, are some of its many advantages:

LOW COST—This is one of the lowest-cost automatic strapping machines on the market today.

COMPACT—Requires only 11½ sq. ft. of floor space. Table height, 31". Weight (approx.), 1500 lbs.

SPEED—Up to 24 ties per minute.

TWO SIZES—Either machine will handle packages as small as 8" wide by 2" high. The larger will handle packages as large as 26" wide by 20" high.

EASY TO OPERATE—Utilizes USS Gerrard Round Steel Strapping from 14 through 18 gauge. Easy to thread and operate.

LOW MAINTENANCE—One-shot, built-in lubrication system and compact, rugged, simple construction mean minimum service and maintenance.

TENSION—Can be predetermined, and when set is uniformly maintained on all packages regardless of size or weight.

SINGLE POWER SOURCE—All functions are mechanically controlled and interlocked. Simply plug in and run.

PACKAGES which vary in size and shape can be strapped without adjustment to machine.

COMPRESSION DEVICE for pre-compressing packages or bundles can be supplied as optional equipment.

QUIET OPERATION—Fully engineered to eliminate noise and vibration.

For more complete details, contact your USS Gerrard sales representative. Also mail coupon for folder and the Gerrard Blue Book of Packaging. This contains full information on all USS Gerrard Machines and round and flat strapping.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CHICAGO, ILLINOIS

USS GERRARD STEEL STRAPPING
Round and Flat
UNITED STATES STEEL

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Gerrard Steel Strapping Division
United States Steel Corporation
4711 S. Richmond St., Chicago, Illinois

Please send me folder on the Automatic Strapping Machine and the 36-page GERRARD Blue Book of Packaging. No obligation.

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Have Salesman Call ☐

SIMONDS FLAT GROUND DIE STEEL

OIL HARDENING TYPE — Non-deforming, spheroidize-annealed for best machinability and consistently uniform hardenability — from Simonds' own steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. Individually packaged (18" and 36" lengths) with simplified heat treating instructions.

AIR-HARDENING TYPE — Non-deforming, spheroidize-annealed 5% chrome — more wear-resistant yet easy to machine and heat treat with uniformly excellent results — another product of Simonds' steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. 36" lengths. Individually packaged with heat treating instructions.

SIMONDS FLAT GROUND DIE STEEL can be the practical solution to *your* production problem . . . especially where cost and quality are important factors. When you use Simonds packaged high quality alloy tool steel some of your manufacturing costs have already been eliminated. You get better results at lower costs because this steel is precision ground to accurate dimensions with an extra smooth finish all ready for scribing and cutting to size or shape. What's more, its wide hardening range makes heat-treating virtually foolproof . . . makes this analysis steel suitable for a multiplicity of uses. Specify "Simonds" and be sure of the greatest satisfaction and lowest cost in the long run. "1001 sizes for 1001 uses" in either OIL or AIR Hardening type steel. AVAILABLE FROM STOCK.

For Fast Service from Complete Stocks

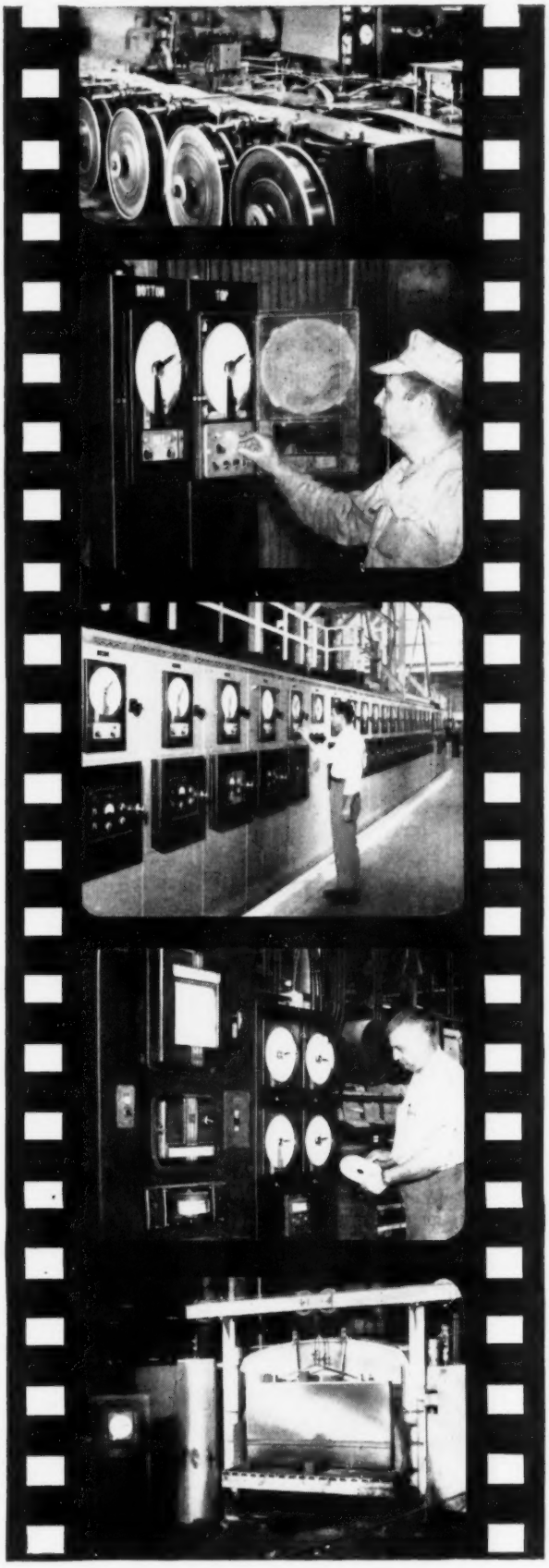
Call your SIMONDS Industrial Supply DISTRIBUTOR

125 YEARS OF GROWTH • 1832-1957

SIMONDS SAW AND STEEL CO.

FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que. • Simonds Divisions: Simonds Steel Mill, Lockport, N. Y. Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada • Heller Tool Co., Newcomerstown, Ohio



Speedomax H . . . widely-read instrument with the high *

* *Industrial Qualifications*

Compact enough to offer savings in valuable panel space, precise enough to suit exacting industrial measuring requirements, sturdy enough to stand up to rugged shop conditions . . . these qualifications are making Speedomax H "preferred reading" in an increasing number of applications throughout steel plants, foundries, and the metalworking industry.

A wide selection of ranges (for temperature, pH, gas analysis, speed, etc.), types of control and other options assures that Speedomax H—round-chart, strip-chart, or indicator—can fully meet the needs of the great majority of applications. And you'll find that our highly-standardized production techniques result in quick delivery and lowered cost.

Simplicity of installation and maintenance, interchangeability of component parts, ease of range conversion are but a few of the features that point to long-range economies as well, when you choose Speedomax H. If you haven't heard the full story on this instrument . . . if you'd like to investigate its potential for expansion or modernization of facilities . . . simply contact the L&N office near you, or write us at 4956 Stenton Avenue, Philadelphia 44, Pa.

LEEDS NORTHRUP
Instruments Automatic Controls • Furnaces

FREE ENTERPRISE IN 24 NATIONS UNITED...

on Choice of Yoder Mills for Pipe and Tube Manufacture

It all started less than two decades ago with the introduction by Yoder—and the rapid adoption by American industry—of a revolutionary new type of mills for cold forming and electric-resistance welding of pipe and tubing. England, France, Italy, Mexico, Argentina, and Brazil soon followed the U.S.A. in adopting Yoder mills. Most other countries which boast any kind of modern metal working industry also invested in one or more Yoder mills, including distant Japan, India, and South Africa. Production, depending on requirements, varies from 25,000 up to 75,000 feet per 8-hour shift.

By this time, England, Italy and Argentina each have a total of ten Yoder mills in operation; Brazil, eight; Mexico, six; France, five; other countries somewhat in proportion to their population. In many nations, Yoder mills now supply from 50% to 90% of all the welded tubes used.

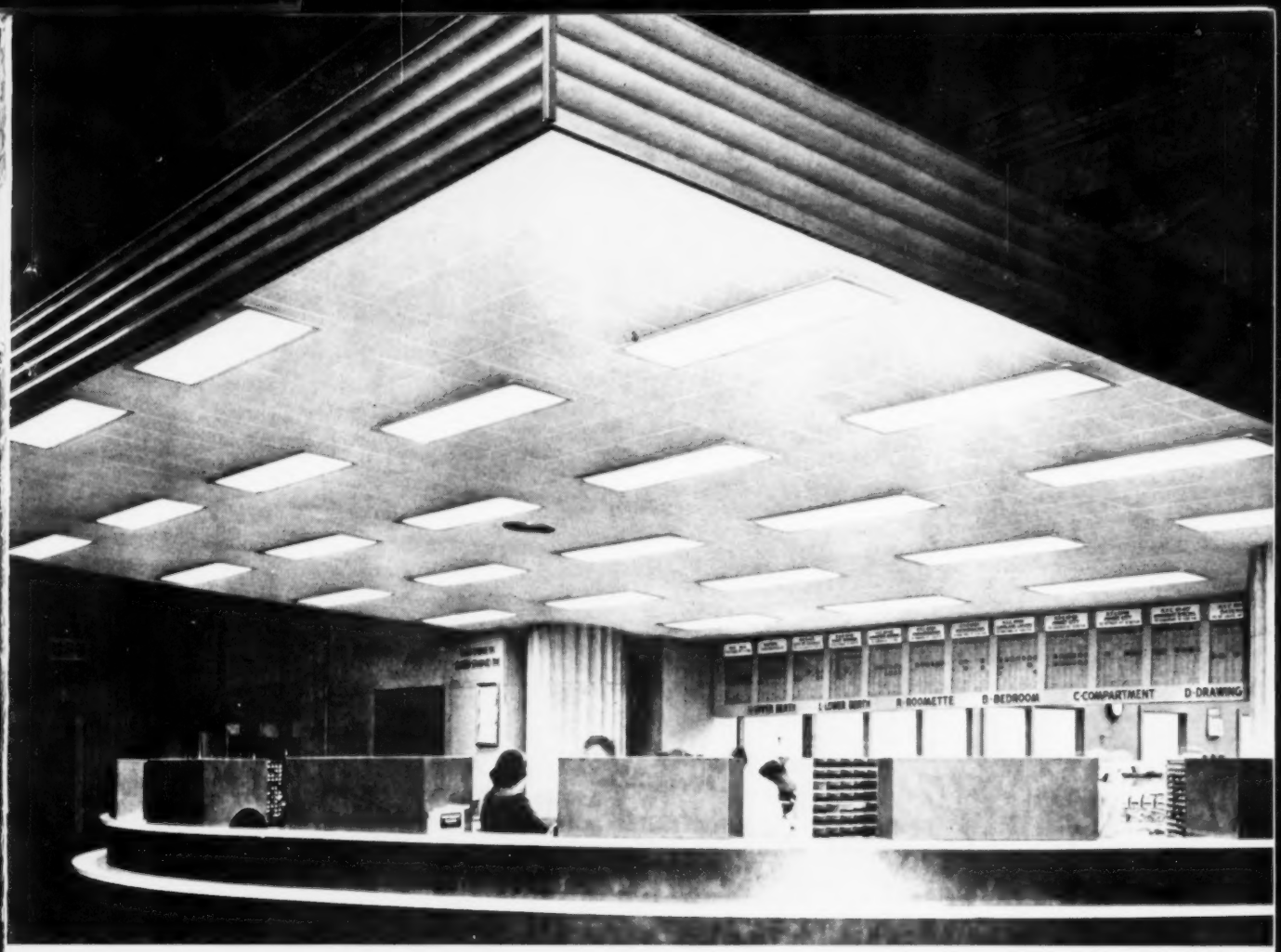
The geographical distance which separates Yoder from many of these countries has proved much less a handicap than might be supposed. Reasons: the simplicity of design, ease of operation and dependability of Yoder mills. Secondly, generous assistance rendered by Yoder in training operators everywhere. In fact, several outstanding production records have been scored by operators in foreign countries, most recently in Italy.

Through technological advances, Yoder leadership in tube mill design has been jealously preserved and strengthened from year to year. Ask for literature giving details of the latest improvements. Correspondence invited.

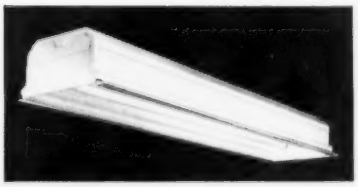
THE YODER COMPANY
5510 Walworth Ave., Cleveland 2, Ohio, U.S.A.

ENGINEERING **YODER** MANUFACTURING

PIPE AND TUBE MILLS (ferrous or non-ferrous)
COLD ROLL FORMING MACHINES
ROTARY SLITTING LINES



MANUFACTURER SHEDS NEW LIGHT ON WEIRZIN® RUST PREVENTION



In the market for a rust-resistant, eye-appealing and economically enduring zinc-coated steel? Then tune in on what the Edwin F. Guth Co., St. Louis, Mo., a leading manufacturer of lighting fixtures, has to say about Weirzin. For example:

RUST PREVENTION: "Weirzin electrolytic zinc-coated steel sheets *assure* our customers of a rustless product regardless of what section of the U.S.A. or hemisphere our Guth fixtures are sold. Whether it's damp, dry, moist or cold, Weirzin sheets once coated with paint really provide a finish that lasts."

PAINT SAVINGS: "There's a decided savings in the amount of paint we use; our finishes seem to grab hold of Weirzin sheets and stay there. Hence, with more positive paint adherence, we use considerably less paint. And, we find our present paint equipment can carry the load without the need for additional equipment."

Chemically treated Weirzin takes a beautiful paint, lacquer, enamel or lithographic ink finish. Holds it better than any other form of steel. Eliminates underfilm corrosion. Weirzin's electrolytic-process zinc coating has the ductility and toughness to withstand the severest fabrication operations. No flaking, peeling; no need for coating or re-coating after fabricating. For specific information on Weirzin in *your* applications, write Weirton Steel Company, Dept. A-15, Weirton, W. Va., for our free illustrated booklet—"Weirzin."

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

Make your x-ray films more revealing

•

In radiographic work . . . every minute detail and shading counts. For consistently uniform results and revealing contrasts, you can depend on the long life and efficiency of ANSCO'S developers and fixers. And isn't it nice to know the best costs no more.

ANSCO LIQUADOL X-RAY FILM DEVELOPER
Convenient liquid developer in concentrated form gives highly uniform results. Easily diluted with 3 parts water, Liquadol brings out maximum definition, contrast and density in radiographs.

ANSCO LIQUADOL REPLENISHER
Designed especially for use with Liquadol Developer. When added in amounts sufficient to sustain proper solution level, Liquadol Replenisher increases working life of original solution—developing time remains unchanged. A real economy in greater production of uniformly processed radiographs.

ANSCO LIQUAFIX FIXING SOLUTION
Reduces clearing time of X-ray films, giving greater and faster production. Liquafix is a single solution fixer-hardener that has only to be diluted with water to provide positive fixing action. Actually processes more films than powder-type formulas.

ANSCO POWDERED X-RAY FIXER
An easy-to-prepare single mix powder formula. Ansco Powdered X-ray Fixer has unusually high capacity, fast fixing characteristics and good hardening properties.

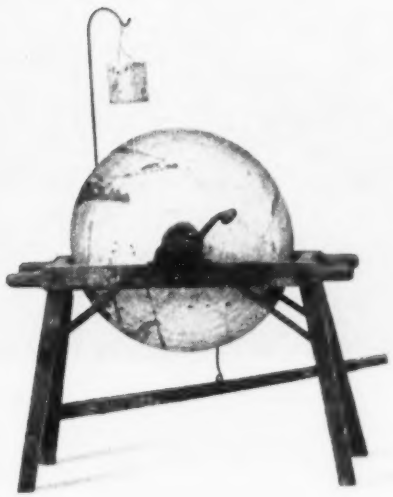
AVAILABILITY

	To Make	*To Make*	*To Make*	*To Make*
LIQUADOL DEVELOPER	1 gallon	5 gallons	20 gallons	200 gallons*
LIQUADOL REPLENISHER	1 gallon	5 gallons	20 gallons	200 gallons*
LIQUAFIX FIXER	1 gallon	5 gallons	. . . . .	400 gallons
POWDERED X-RAY FIXER	1 gallon	5 gallons	20 gallons	50 gallons

**Supplied in 50 gallon size collapsible rubber drums.*

A complete line of Ansco X-ray products is carried by your local X-ray equipment dealer. For further information, or if you would like our Ansco representative to call on you, write to Ansco X-ray Sales Department, Charles Street, Binghamton, N. Y.

Ansco BINGHAMTON, NEW YORK • *A Division of General Aniline & Film Corporation*



"We grind no axe . . . **and really have no need to.**" After all, Bliss makes so many types and sizes of metalworking presses—actually many more than any other builder—that we favor only the one right press for your job. It may be a big one, a little one, a mechanical, a hydraulic, a standard or a special. But you can be sure it will be the *right* one.

If you have a pressed metal problem, isn't it logical to talk to a source that's certain to give you an impartial answer? To talk to Bliss?

BLISS
SINCE 1857

E. W. BLISS COMPANY · Canton, Ohio

100 years of making metal work for mankind

PRESSES • ROLLING MILLS • MILL ROLLS • DIE SETS • CAN MACHINERY • ORDNANCE

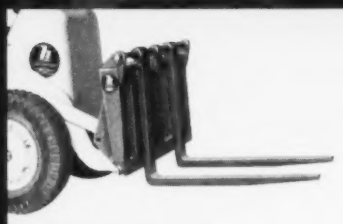
Foundry Handyman

It hauls . . . lifts . . . carries . . . stacks . . . sweeps

Looking for a low-cost method to mechanize all your material handling work? With easily interchanged front-end attachments, there's no limit to the usefulness of one basic Model HA "PAYLOADER". Around molding stations, mixers, shakeout floors, cleaning rooms and outside yard and storage areas, a "PAYLOADER" tractor-shovel travels and handles tons of sand, supplies and finished products with one-machine economy.

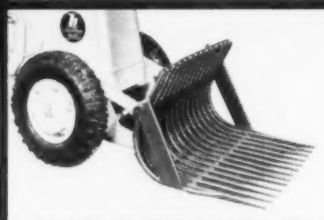
Smallest of the "PAYLOADER" line, the Model HA is available with bucket sizes ranging from 9 to 36 cu. ft. — depending on weight of material (2,000 lbs. carry capacity). Its compactness, speed and easy maneuverability permits the HA to move in and out of cars, up and down narrow aisles and ramps, and work in close quarters.

Other important HA "PAYLOADER" operating features: rear wheel steering . . . 40° bucket roll-back at ground level . . . exclusive one-lever bucket control . . . torque converter drive . . . two speeds in either direction.



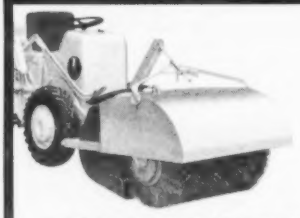
FORK LIFT

Handles all kinds of palletized and unit loads . . . lifts and stores skids, boxes, barrels, crates . . . loads finished products.



CASTINGS BUCKET

Picks-up, handles and moves scrap and small parts . . . combs castings out of molds and delivers to shakeout or grinding room.



PICK-UP SWEEPER

Easily attaches to standard bucket . . . has its own powered broom. Cleans aisles and work areas . . . carries and dumps its own load.

THE FRANK G. HOUGH CO.
733 Sunnyside Ave., Libertyville, Ill.
Send full "PAYLOADER" information on:

- ☐ Model HA (9 to 36 cu. ft.)
- ☐ Larger models

Name _____
Title _____
Company _____
Street _____
City _____ State _____
93

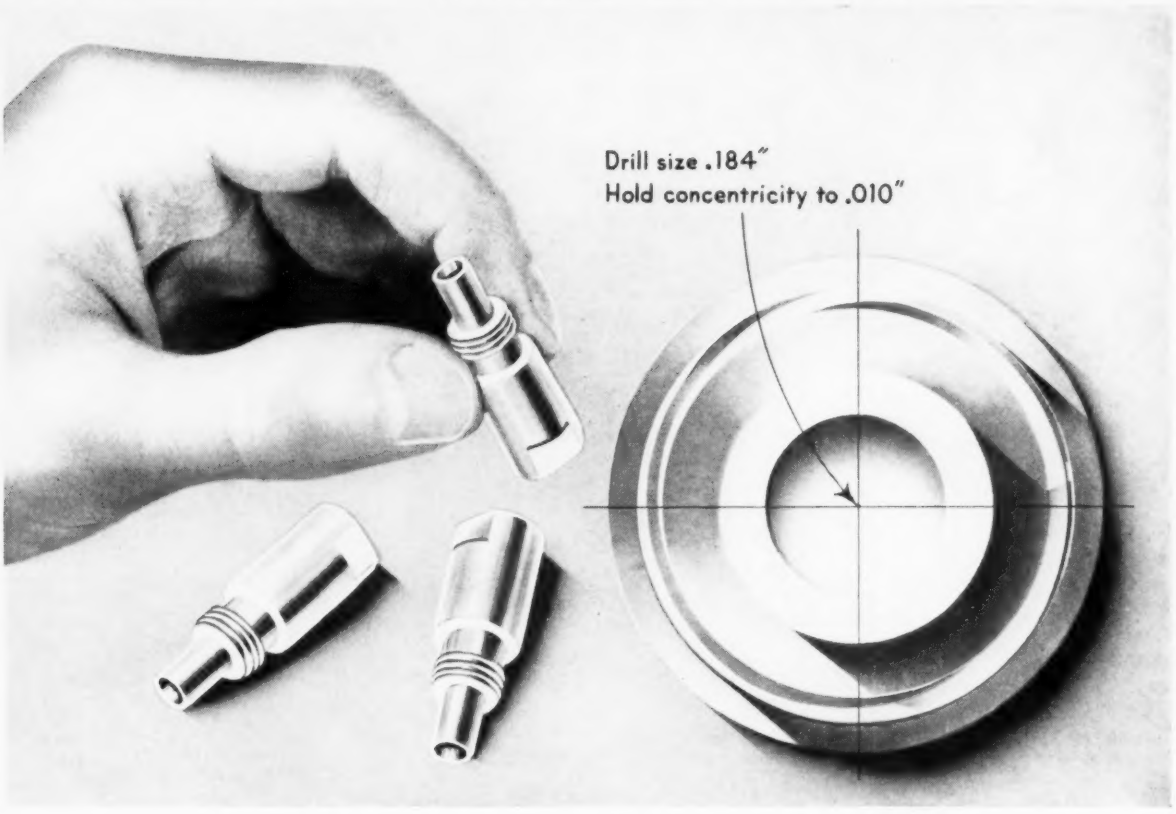
On-job Demonstration

The nearby Distributor will be glad to show you what a "PAYLOADER" with useful extra attachments can do for you — call him today!

SAY "HUFF"

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

How Anaconda can help you get the exact Rod to fit the job



THE broad line of Anaconda free-cutting copper and copper-alloy rods gives you widest latitude in selecting from warehouse stock the precise rod for most screw machine jobs. But every once in a while there are special requirements.

One company's problem: The M. J. Grass Screw Machine Products Co., Buffalo, N. Y., machines a part for a gas-burner base from ½" round free-cutting brass rod. Specifications call for a hole $1\frac{1}{16}$" deep by .184" in diameter—with concentricity held to .010".

With standard free-cutting brass rod the drill had a tendency to wander, running the concentricity off as much as .024". To correct this, The American Brass Company provided rod stock with a minor variation in fabrication for deep drilling. This free-cutting brass rod has a slightly harder core, which minimizes the tendency of the drill to run off center at the high drilling speeds used. Now M. J. Grass holds the concentricity to .008" or under. With regular free-cutting brass, rejects ran as high as 15%. With the deep-drilling rod, there are no rejects.

Your requirements: Anaconda Rods are consistently uniform in composition, temper, and free-cutting characteristics. Consequently, they make possible easy duplication of cutting speeds and feeds known to be satisfactory from previous job records.

When you need special physical characteristics, such as a harder core for deep drilling or additional ductility to permit spinning or cold forming after machining, either the temper, the alloy, or both can be adjusted to meet your requirements.

Free technical service: It is the function of the Technical Department of The American Brass Company to assist metal users in the solution of special problems. This service is at your disposal without charge.

Comprehensive data on composition and machinability of standard Anaconda Alloys, standard specifications, weights, and dimensions of standard rods is available in Publication B-3. For this booklet – for special technical assistance – write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

ANACONDA® RODS FOR SCREW MACHINE PRODUCTS

MADE BY THE AMERICAN BRASS COMPANY

PRODUCTION MACHINERY

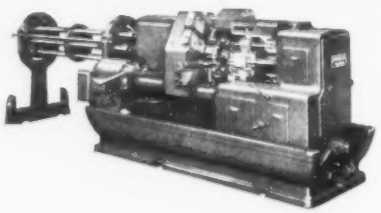
GREENLEE

AUTOMATIC BAR MACHINES

HELP YOU BEAT RISING PRODUCTION COSTS

The cowman achieves speed and power in a good "using" horse by years of careful breeding . . . Greenlee develops these same qualities in its Bar Automatics by continuous research and design improvement. One of the many superiorities of this speed and power is that it enables you to take full advantage of modern tooling practices. Your Greenlee representative will be glad to show you how it is done. Please submit print when inquiring about a specific job.

Write for Catalog No. A-405



SIX AND FOUR-SPINDLE AUTOMATIC BAR MACHINES

GREENLEE Special Machine Tools

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Hydro-Borer Precision Boring Machines

GREENLEE BROS. & CO.

1806 MASON AVE.
ROCKFORD, ILL.

Real tension on this job!

When the man on the right tightens the strap and the man on the left applies the seal—tying the knot, in effect—the strength of steel is on the job. The tension the strap will take and hold, its flatness and its flexibility make an indispensable combination for holding these coils of steel and for holding and reinforcing countless other materials and packages for industry. There's a right size of Signode steel strapping for your needs. There are hand tools and pneumatic tools and even completely automatic tools for applying it at lowest cost. It can make your product cost less to handle, store, ship and receive. See your Signode representative. No obligation. Just write:

SIGNODE STEEL STRAPPING CO.

2623 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-wide.
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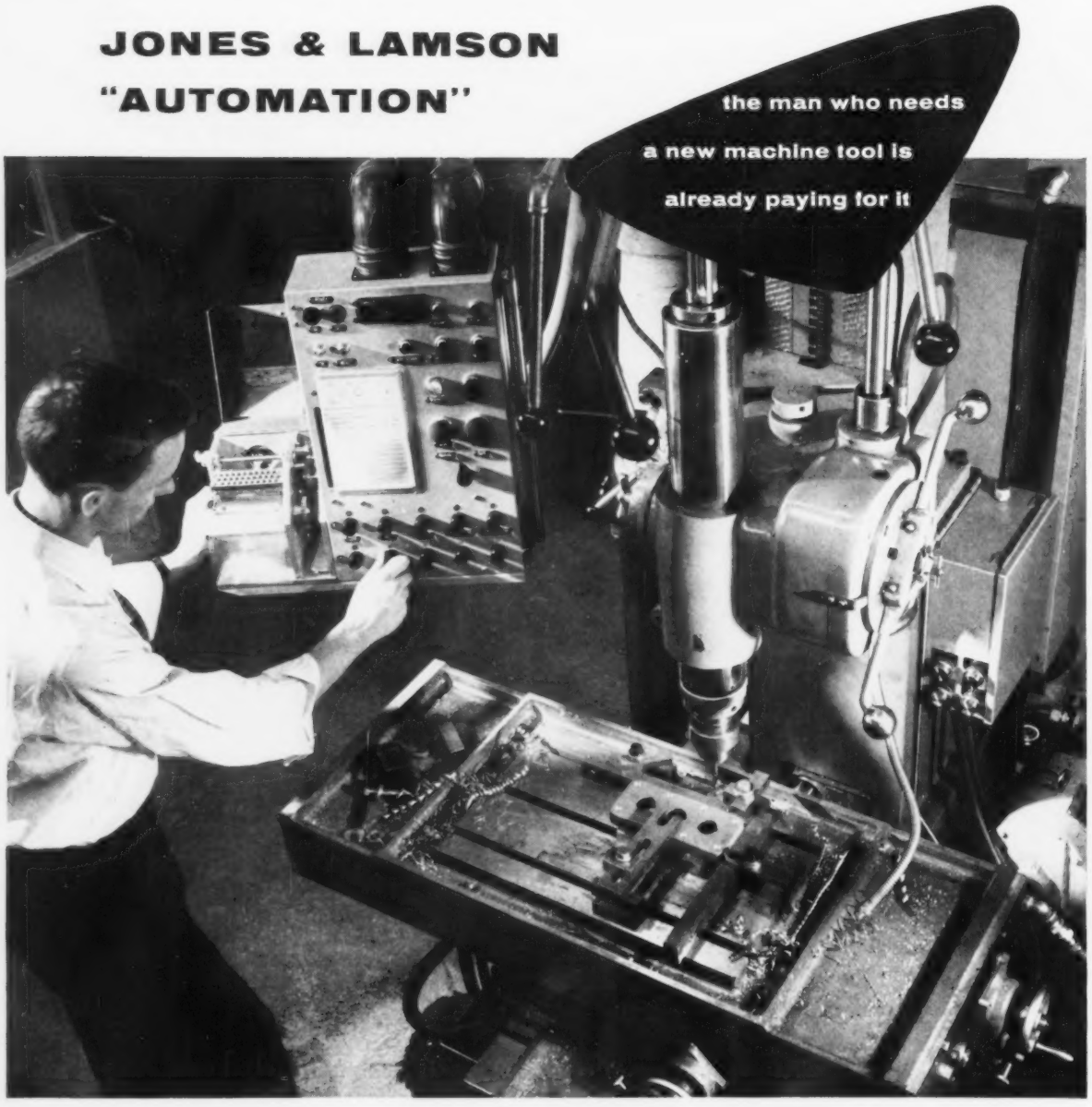
JONES & LAMSON "AUTOMATION"



This tape-controlled table eliminates set-up time on small lots

It's natural enough, in a way, to associate "automation" with huge plants and their long, high-speed production lines.

We should also keep in mind, however, that certain "automation" techniques offer tremendous benefits to the *small job shop*. Jones & Lamson research and development have produced remarkable results in applying "automation" to small-lot production.

Are you interested in drastically cutting set-up and change-over time, and greatly increasing your small-lot flexibility? We'd be pleased to show you how the results of our intensive research and development programs can be put to good use in *your* operations.

Write for literature. JONES & LAMSON MACHINE COMPANY, 511 Clinton Street, Springfield, Vermont.

Turret Lathes • Fay Automatic Lathes • Milling & Centering Machines • Optical Comparators • Thread Tools • Thread & Form Grinders

To Solve Your Metal Cutting Problems — Your Victor Distributor Will Help You Select the Right Victor Blade For Every Job!

No magic — just common sense! *Victor* Saw Blades are Better Blades — Do the Job Faster, Easier . . . Last *Longer!*

Always specify Victor Blades for hand and power saws. It won't take long for you to see the difference . . . on the production line *and* on the cost sheets!

Because Victor Blades are made better — to give you what you need for efficient, low-cost, high-speed operation. Victor Blades provide uniformity, proper hardness, efficient tooth design . . . *plus* the convenience assured by ample set for clearance and clear, easy-to-read markings. These things add up to the reason why Victor is the best blade buy — everywhere!

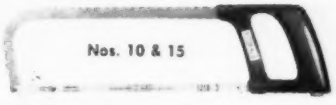
REMEMBER THESE 5 VITAL COST-CUTTING POINTS WHEN YOU ORDER SAW BLADES:

1. **UNIFORMITY** — Quality must be consistent . . . in *every* blade.
2. **HARDNESS** — Blades must be heat treated and tempered to the proper degree.
3. **EFFICIENT TOOTH DESIGN** — For fast and efficient cutting.
4. **BALANCED SET** — For clearance and accuracy of cut.
5. **CLEAR MARKINGS** — For easier, quicker identification.

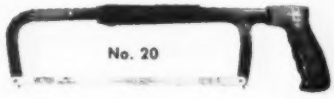
AND REMEMBER:
VICTOR GIVES YOU ALL 5!

VICTOR

SAW WORKS, INC. • MIDDLETOWN, N.Y., U.S.A.
Makers of Hand and Power Hack Saw Blades, Frames and Metal and Wood Cutting Band Saw Blades



No. 10 — Yellow molded handle. Shaped for comfort. Almost indestructible! Patented Lever-Lock positions, tensions blades *automatically*. **No. 15** — Red molded handle, chrome-plate finish. Same features as No. 10.



No. 20 — Gunmetal Finish, features adjustable pistol-grip Frame, Lever-Lock for extra-easy blade change.

FREE — FOR THE SHOP . . . the Victor Metal Cutting Chart — an invaluable on-the-spot guide for shop metal workers.

FREE — FOR YOU . . . Victor's Handy METAL CUTTING GUIDE . . . packed with valuable information on blade types, cutting techniques . . . feeds and speeds . . . plus important general metal cutting information.

VICTOR SAW WORKS, INC.
Middletown, N.Y., U.S.A.

☐ Please send me the Victor Metal Cutting Chart
☐ Please send me the Victor Metal Cutting Guide

Name_____ Title_____
Address_____
City_____ Zone____ State_____

Got a wire problem?

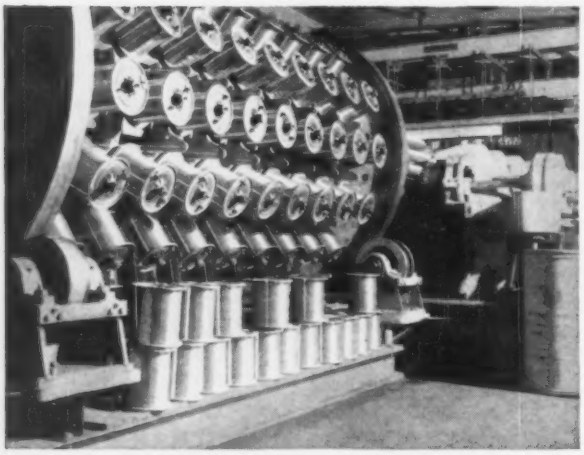
Commercial and industrial buildings must conform to an exacting set of fire and safety regulations. Glass areas are particularly troublesome because high winds and flying objects can fracture the glass and the fragments can slash a person to ribbons.

Fire can melt the glass and permit disastrous drafts that will fan a small blaze into a catastrophic fire.

For these reasons, critical glass areas must be made from wire-reinforced glass. You've seen the old-style "chicken netting" wire glass. It's durable and strong, but it hardly fits in with the sleek decor of a modern building. Mississippi Glass Company (world's largest manufacturer of rolled glass) designed a new wire reinforcement using a simple, *welded* netting wire. They asked American Steel & Wire, "Could it be made?"

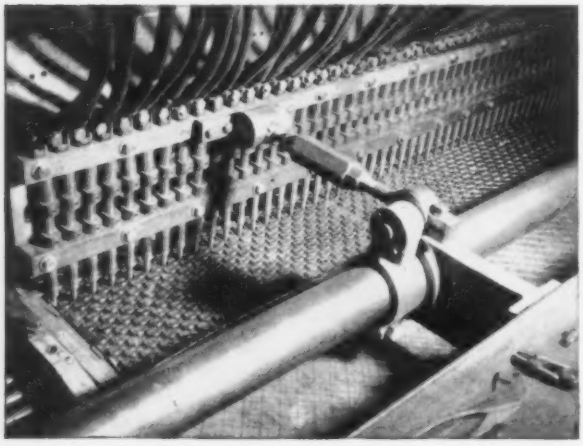
The wire had to be absolutely clean and free of dirt particles and moisture that would cause bubbles in the glass. Under these extreme cleanliness conditions, the wire had to be welded at every intersection, wire that was only .0204″ in diameter. Mississippi Glass Company designed a special machine, the only one of its kind in the world, that carries 127 spools of wire, weaves it into 66″-wide fabric, welds every joint, preserves the cleanliness and produces about two miles of netting every day.

So if *you* have a tricky wire problem, recall that American Steel & Wire knows how to do things with wire. And at the lowest possible cost. Just call your AS&W representative.

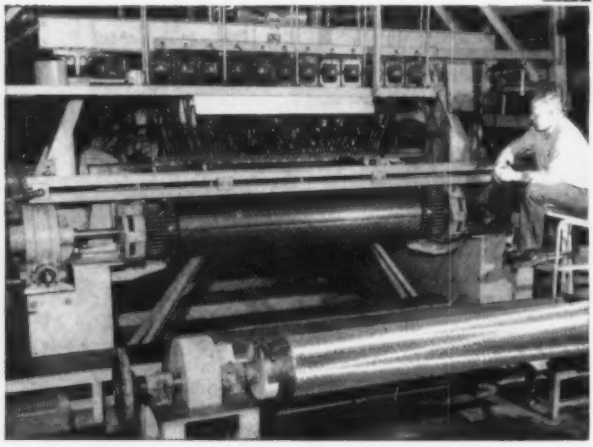


Spool end of the weaving machine. We produce a special-finish Annealed Glass Netting Wire for this use.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

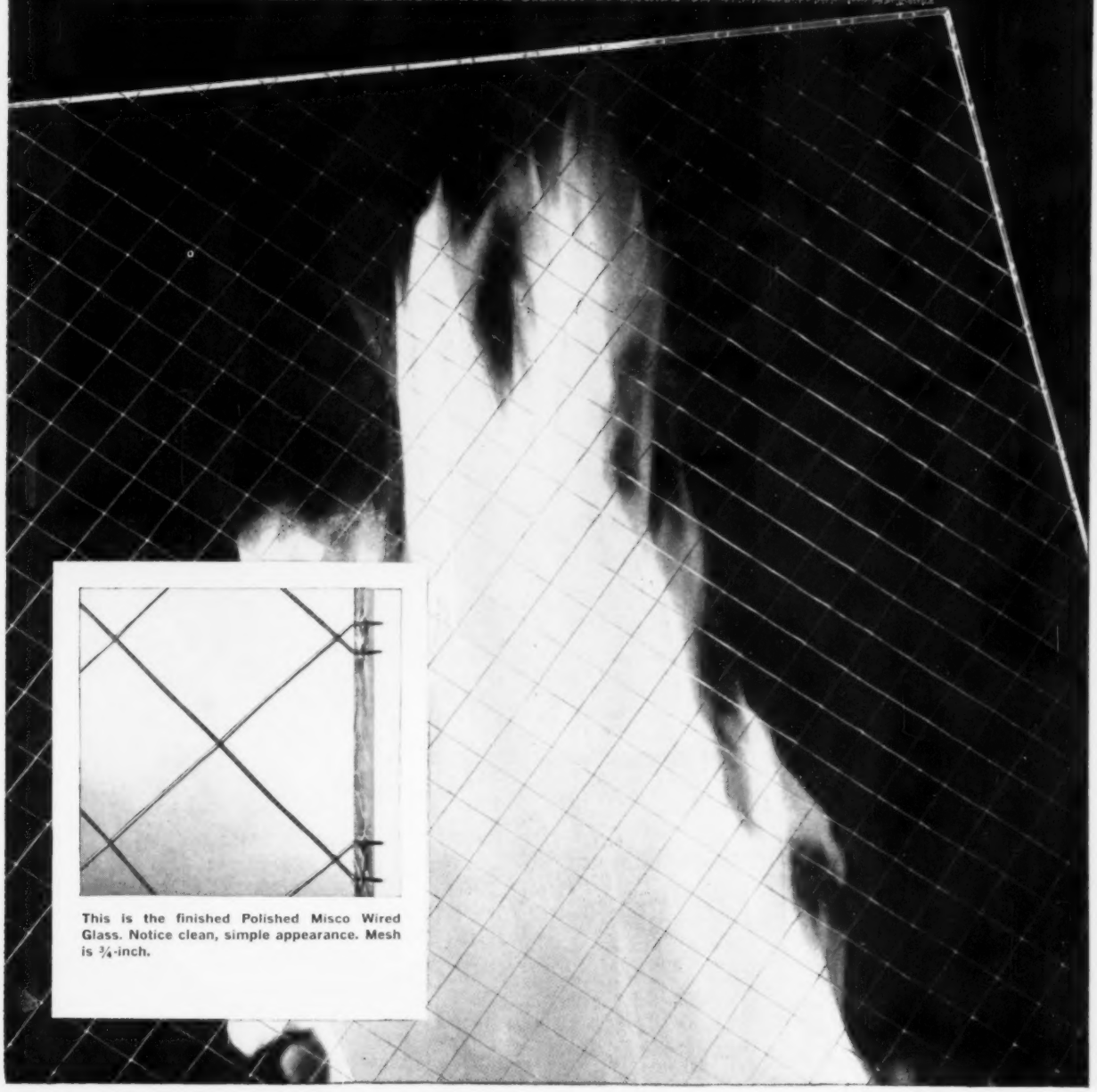


Welding the joints in the netting. This is a difficult operation, requiring very careful control.



Delivery end of netting machine. The 66"-wide rolls are made in lengths of 500 feet.

Look at this one!



This is the finished Polished Misco Wired Glass. Notice clean, simple appearance. Mesh is ¾-inch.

USS AMERICAN MANUFACTURERS WIRE

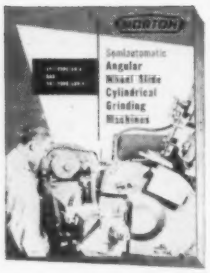
USS

AMERFINE—*high-quality fine wire.*
AMERSPRING—*music steel spring wire.*
AMERTEMP—*heavy-duty oil-tempered wire.*
AMERLOY—*alloy heading wire.*
AMERHEAD—*uniform heading wire.*
AMERSTITCH—*extra-tough metal stitching wire.*

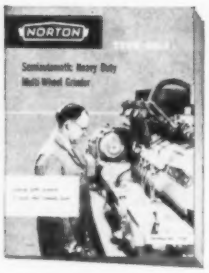
UNITED STATES STEEL

CYLINDRICAL GRINDERS

10" Type CTU and 14" Type LCTU. Semiautomatic or plain. For plunge or traverse operations, from roughing cuts to finest finishing. Can take a wide range of multi-wheel mounts. In production line and job shop work these machines have doubled production, replaced several machines, eliminated extra operations. *Catalog No. 1787*

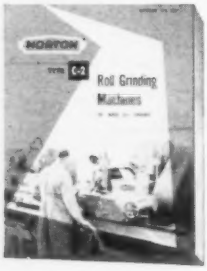


10" Type CV-4 and 14" Type LCV-4 Angular Wheel Slide. Semiautomatic machines that grind thrust surfaces and adjacent diameters in one fast, automatic plunge operation. They leave a concentric grain pattern in the thrust surface finish, assuring a better seal surface and appearance. *Catalog No. 1658*



Type CM-1 Heavy Duty Multi-Wheel. Semiautomatic. Makes four or more cuts simultaneously, in a single plunge-grind cycle. Brings new speed, accuracy and economy to the grinding of multi-diameter parts. Many automatic features, including one-lever control. *Catalog No. 1550*

ROLL GRINDERS



Type C-2. A heavy duty machine, featuring faster cutting, quicker set-ups, easier operation. Available as a plain, semiautomatic or roll grinder. One-lever control of grinding cycle on the semiautomatic. As a roll grinder it includes the famous Norton tilting wheel head. *Catalog No. 1827*

CAM GRINDERS

NO. 3 CAM-O-MATIC Cam Grinder.* An automatic, hydraulic machine that is setting new standards for production, precision and finish. Grinds all cams and the camshaft eccentric successively and automatically, in one handling. Entire operation geared to split-second efficiency. *Catalog No. 191*

Check these guide books to

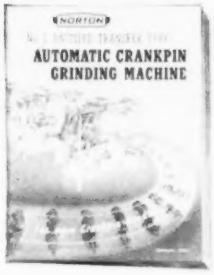
Get the facts on how Norton grinding machines can benefit your production

In building the world's largest line of grinders and lappers — including automatic machines and machines for specialized operations — Norton offers you the greatest opportunities to modernize.

A representative selection of Norton machines is listed here, together with their catalogs. It will pay you to send for any catalog that concerns your grinding or lapping operations. Learn how replacing your obsolete equipment with new Norton machines will enable you to meet competition with the best production tools in the field. Learn also, how the Norton Lease and Financing Plans enable you to modernize, yet conserve your capital.

Ask your Norton representative for the literature you want, or write direct. And remember: only Norton brings you such long experience in both grinding machines and grinding wheels — to bring you the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

CRANKPIN GRINDERS



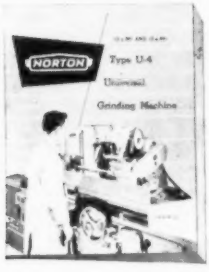
No. 2 Unitized Automatic Transfer Type. For completely automatic crankpin grinding. Locates, grinds, gages, transfers — all automatically — cutting costs on each crankshaft ground. Typical of Norton's rapid progress in automatic operation. *Catalog No. 2350-1.*

CUTTER AND TOOL GRINDERS

No. 20 Cutter And Tool Grinder. Fastest, most versatile machine in its class. Wheel head tilts 15° above or below horizontal and swivels through 360°, simplifying many difficult grinding jobs. Easy to set up, operate and maintain. *Catalog No. 189*

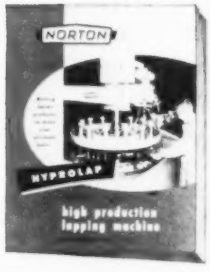
No. 2 BURA-WAY Tool Grinder.* Unequalled for grinding convex single point and form tools. Generates, produces and maintains relief angles constant in the direction of the feed. Duplicates the master tool form exactly. Extends the life of carbide-tipped and other tools. *Catalog No. 220*

UNIVERSAL GRINDERS



Type U-4, 12" x 36" and 12" x 48". Quick, easy set-ups plus fast grinding action save time and costs on a wide variety of external, internal, face and angular wheelslide jobs. Simply turning a dial gives an infinite number of works speeds over its 40 to 400 rpm range. *Catalog No. 231*

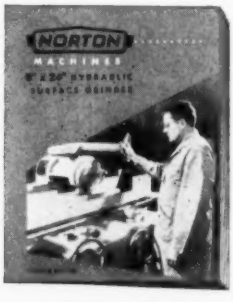
LAPPERS



HYPROLAP Lapping Machine No. 48E.* An extremely fast, high production machine for single or parallel face flat lapping. Bonded abrasive laps produce work pieces free of grit. Three arrangements: plain, timed cycle; automatic continuous feed; semiautomatic continuous feed. *Catalog 1954*

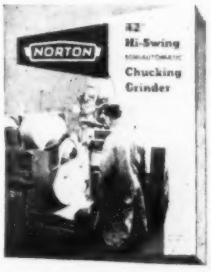
Vertical Lapping Machine No. 16FC. Outstanding productive capacity for flat work up to 3" x 5" and cylindrical work up to 3" diameter. Can produce optically flat surfaces and diameter tolerances in millionths, with fine repetitive accuracy. *Catalog No. 212.*

SURFACE GRINDERS



8" x 24" Hydraulic. Grinds plane surfaces speedily and economically, in large stock removal or close tolerance operations. Designed with both hand and hydraulic table cross feed. Convenient controls and easy accessibility reduce operating and maintenance time. *Catalog No. 190*

SPECIAL GRINDERS



42" Hi-Swing Semi-Automatic Chucking Grinder. For rapid, accurate grinding of large diameter, short parts, such as jet engine compressor wheels and similar components. Takes work held by chucks, face plates or special fixtures and permits grinding several surfaces without disturbing the set-up. *Catalog No. 1780.*

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

To Economize, Modernize with NEW

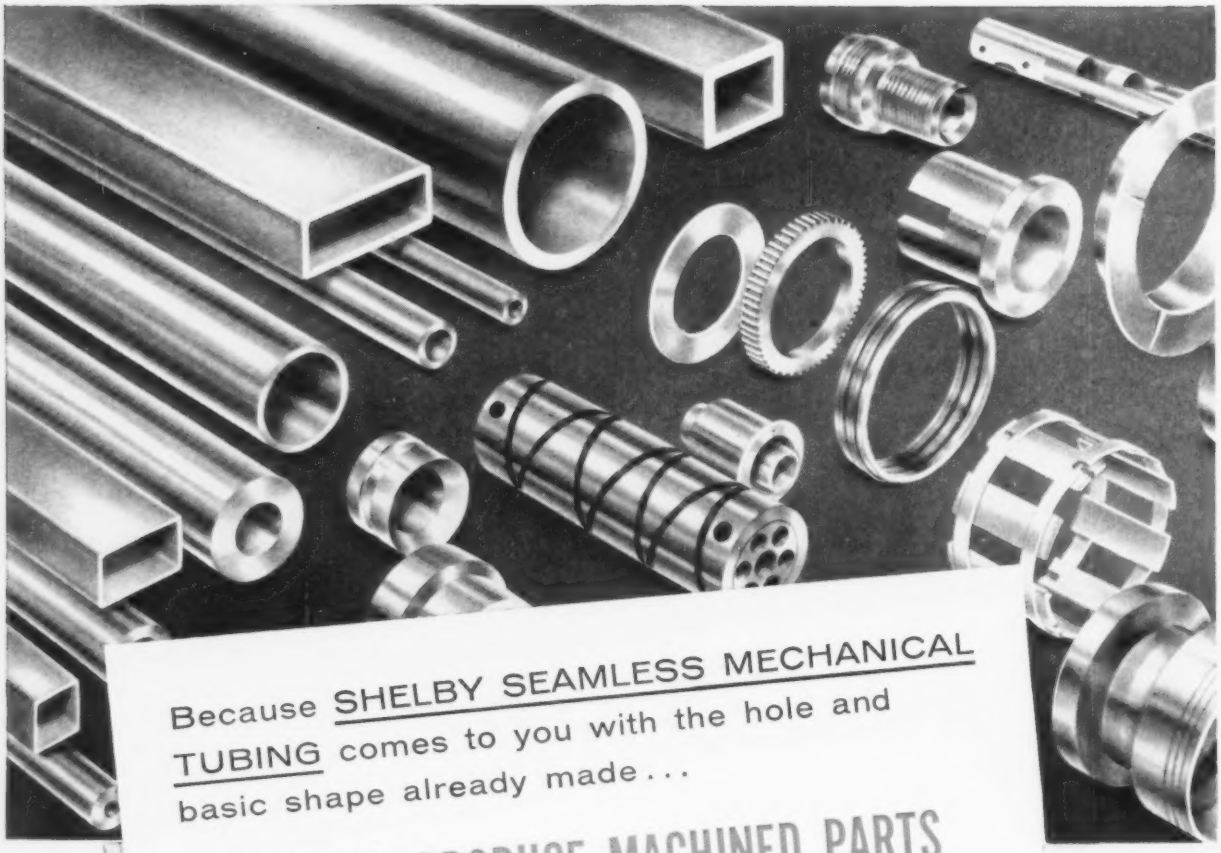
NORTON

GRINDERS and LAPPERS

Making better products . . . to make your products better

District Offices: Worcester • Hartford • New York Area, Teterboro, New Jersey • Cleveland • Chicago • Detroit
In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5

FOR MECHANICAL TUBING.



Because SHELBY SEAMLESS MECHANICAL TUBING comes to you with the hole and basic shape already made . . .

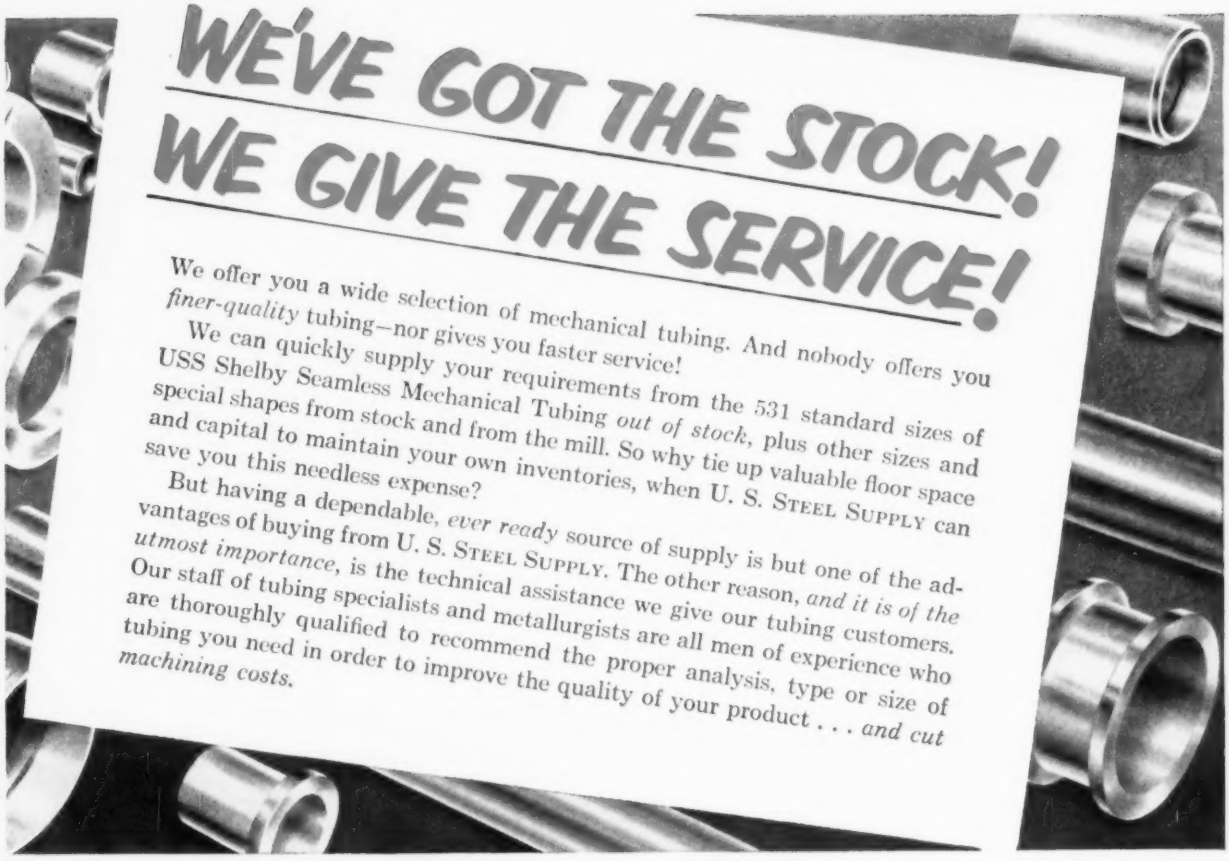
YOU CAN PRODUCE MACHINED PARTS LIKE THESE AT SAVINGS UP TO 50%

If you have been making parts like these from solid stock, you can make them better, faster and with less cost by switching to Shelby Seamless Mechanical Tubing. For with Shelby Mechanical Tubing, you eliminate or greatly reduce many time-and-labor-consuming operations connected with boring and machining.

Shelby Mechanical Tubing can also be effectively substituted for forgings, with equally attractive savings in time and labor, because the extremely close tolerances you get with tubing permit you to omit the double chucking required with forgings.

The excellent machining characteristics and uniformity of Shelby Seamless Mechanical Tubing enable you to *turn out parts by the millions, and the last part will be as metallurgically and dimensionally accurate as the first.* These advantages save wear on tools and needless waste of steel.

...CALL U.S. STEEL SUPPLY



WE'VE GOT THE STOCK! WE GIVE THE SERVICE!

We offer you a wide selection of mechanical tubing. And nobody offers you *finer-quality* tubing—nor gives you faster service!

We can quickly supply your requirements from the 531 standard sizes of USS Shelby Seamless Mechanical Tubing *out of stock*, plus other sizes and special shapes from stock and from the mill. So why tie up valuable floor space and capital to maintain your own inventories, when U. S. STEEL SUPPLY can save you this needless expense?

But having a dependable, *ever ready* source of supply is but one of the advantages of buying from U. S. STEEL SUPPLY. The other reason, *and it is of the utmost importance*, is the technical assistance we give our tubing customers. Our staff of tubing specialists and metallurgists are all men of experience who are thoroughly qualified to recommend the proper analysis, type or size of tubing you need in order to improve the quality of your product . . . *and cut machining costs.*

... and, remember, only U. S. STEEL SUPPLY gives you the extra time-saving BONUS of "GRADE MARKED" Shelby Tubing!

When you buy from U. S. STEEL SUPPLY, you are assured of getting not only the finest mechanical tubing on the market, but you also get our exclusive "Grade Mark" Service—*the newest aid to better stock room control offered industry*—at no extra cost.

"Grade Mark" Service is our new and improved method of bundling and marking shipments of Mechanical Tubing, and is designed to simplify the identification of the tubing in your order and make it much easier for your receiving department to stock incoming shipments properly. Your order will be shipped out in neatly strapped bundles, and each bundle will carry a seal which clearly shows the grade of tubing in that particular bundle. Thus without altering your stocking procedure in any way, you save time and trouble in locating, identifying, and handling the needed grade. Your order will be shipped from the warehouse nearest the point of delivery.

SEND FOR THIS FREE BOOKLET—It's a handy pocket size reference book on Shelby Seamless Mechanical Tubing that you'll turn to again and again. Covers tolerances, machining allowances, physical properties and other important data. For your free copy of this 115-page book, contact our nearest office.

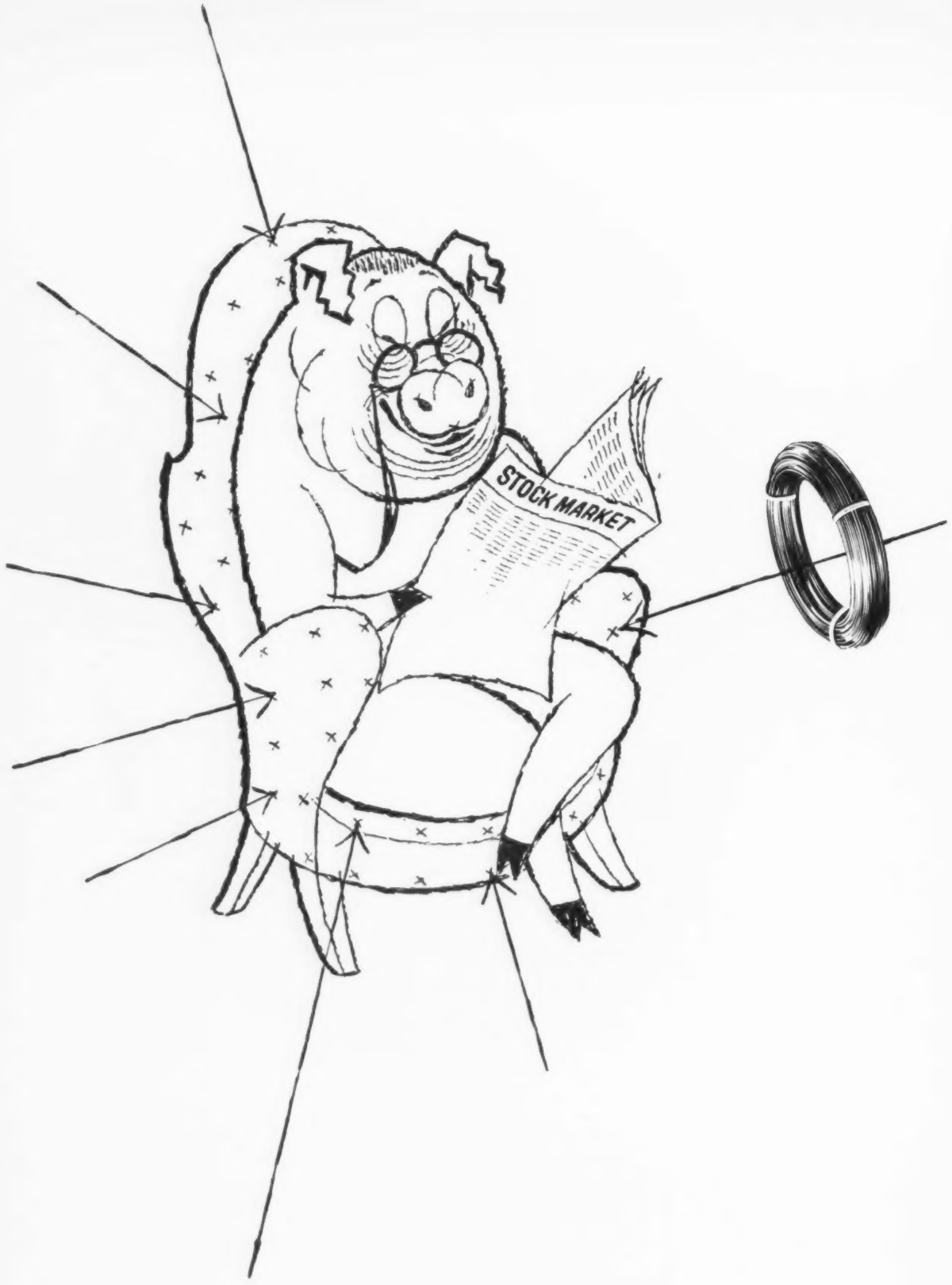
U. S. STEEL SUPPLY

DIVISION

P. O. Box 1099, Chicago 90, Ill. *General Offices:* **208 So. La Salle Street, Chicago 4, Ill.**

Warehouses and Sales Offices Coast to Coast

UNITED STATES STEEL


STOCK MARKET

hog rings that never see a hog

Not all hog rings are used to keep hogs from rooting up the ground with their snouts. One type is used by upholsterers to fasten burlap and similar materials. These rings are often made from a special hard drawn, low carbon CF&I-Wickwire Wire which is free from surface imperfections and wire-drawing lubricants.

Chances are you don't need wire to make hog rings. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

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CF&I

4238

In 10 short years the Chambersburg CECO-DROP has become the standard gravity drop hammer of the forging industry. Some of the reasons for this astonishing success are these:

1 The Ceco-Drop is a proven tool, the original "Boardless Board Drop Hammer," with world wide acceptance.

2 More than 400 Ceco-Drops are in service in 119 forge shops all over the world. Many companies have initiated programs looking toward complete conversion to Ceco-Drops.

3 The Ceco-Drop has created new standards of performance, and established new standards of tolerance in drop forgings.

4 The Ceco-Drop minimizes leg fatigue in drop hammer operation. Hammermen prefer the Ceco-Drop.

5 The Ceco-Drop costs less to maintain, has fewer, more durable parts. Automatic lubrication prolongs parts life.

6 The Ceco-Drop is economical to operate. Air or steam is used only when the hammer is running.

7 The Ceco-Drop forges more minutes per hour. (Once it is set-up, just turn on the air or steam and forge.) It does more forging per blow, requires no board changes, no friction adjustment.

8 The Ceco-Drop is safer . . .The operator's station is clear. There are no overhead hazards. It has fewer, lighter mechanisms. It has a safety dog and safety cylinder cover. Power failure stops the hammer and clamps the ram.

9 The Ceco-Drop requires less die set-up time. Die changes are quicker, easier. It takes but a minute to adjust the stroke.

10 The Ceco-Drop has a wide range of operation due to the unique short stroke adjustment and control.

CECO-DROP

U. S. PATENT NO. 2,604,071, JULY, 1952 . . . OTHERS PENDING
CECO-DROPS HAVE BEEN BUILT IN SIZES FROM 500 LBS. TO 8000 LBS.

Builders of THE IMPACTER
"FORGING IN MID-AIR"

CHAMBERSBURG ENGINEERING CO. • CHAMBERSBURG, PENNA.

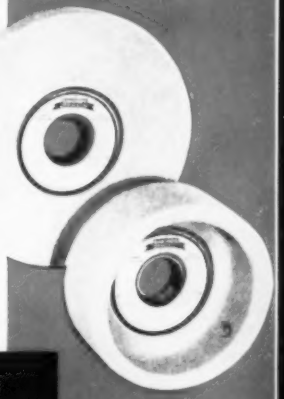
Here's "What's NEW!" with SIMONDS ABRASIVE CO. GRINDING WHEELS

NEW IL BOND . . . for longer, faster, heavy-duty grinding

New IL Bond . . . it's in the grinding wheel mix. Special chemicals and compounds added to conventional resinoid bonds provide an *internal lubricant* to increase cutting action and prolong grinding wheel life. For ALL your snagging jobs!

NEW DA Borolon® TRADE MARK . . . abrasive for resinoid bonded snagging wheels

New DA Borolon . . . an improved, smaller crystal aluminum oxide abrasive for resinoid snagging wheels for floor stand and swing frame grinders . . . has more and sharper cutting edges, gives more production. Use with IL Bond described above.



NEW SA Borolon® TRADE MARK . . . abrasive for toolroom grinding wheels

New SA Borolon . . . a radically different, friable aluminum oxide abrasive with a unique *single* crystal formation that gives cooler, faster grinding and longer life. Ideal for tool and cutter grinding and horizontal surface grinding.

Send for descriptive catalog bulletins on these new products. Ask for IL, DA or SA bulletins.

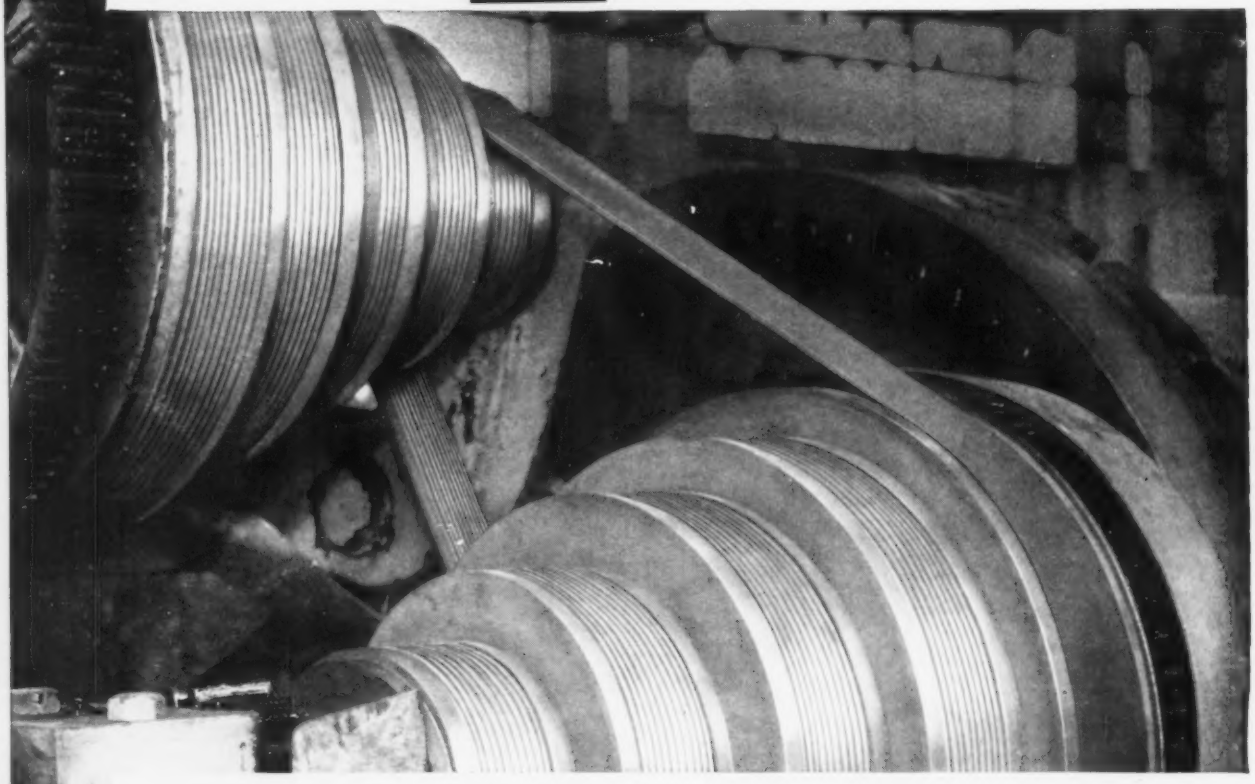
SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., Philadelphia 37, Pa.

DIVISION OF SIMONDS SAW AND STEEL CO.

BRANCHES: PHILADELPHIA • CHICAGO • DETROIT • LOS ANGELES
SAN FRANCISCO • PORTLAND, ORE.

Users Say R/M BELTS AND HOSE



It's *Poly-V*® . . . and Trouble-Free!

Major causes of drive trouble have been engineered *out* of R/M's patented, new Poly-V Drive. Because it employs a single, endless V-ribbed belt running on sheaves specially designed to mate precisely with the belt ribs, Poly-V delivers more power per inch of drive width than ever before possible! R/M Poly-V delivers up to 50% more power than an ordinary V-belt drive of equal width . . . equal power in as little as ⅔ the width. This means *narrower sheaves . . . less shaft overhang . . . less drive weight* on heavy duty power driven equipment.

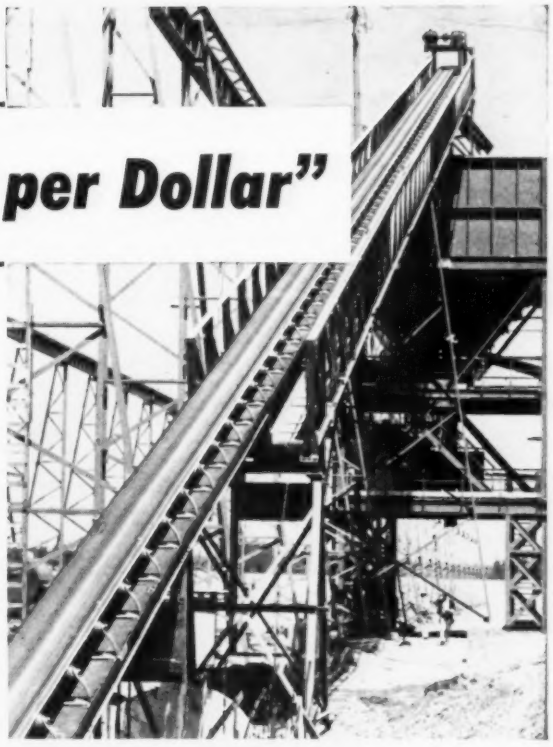
R/M Poly-V's single unit belt design also eliminates "length matching" problems and downtime for belt replacements. Poly-V belt speed ratio and belt position remain constant from no load to full load to run smoother and cooler — with *less wear* on belt *and* sheaves! Just two cross sections of Poly-V belt meet *every* heavy duty power requirement: belt and sheave inventories are cut to a new low!

An R/M representative will show you other features of Poly-V* Drive that add up to longer, trouble free service for every heavy duty power drive application.

Write for Bulletin #6638

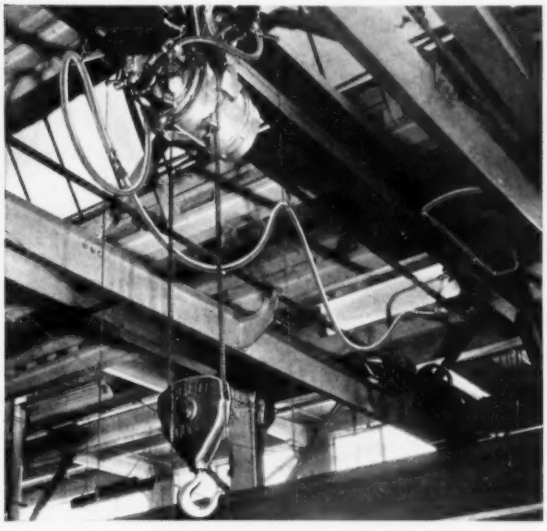
And . . . for the "Smoothest Running V-Belts Made" Specify R/M CONDOR and SUPER-POWER V-BELTS

Give You "*More Use per Dollar*"



Allflex Hose—Light, Strong, "Flexible as a Rope"!

This new R/M hose offers a degree of rugged strength with light weight and flexibility not possible with ordinary all-purpose constructions. Allflex hose coils and uncoils freely in *any* direction . . . *without kinking*. Uniform inside and outside diameters permit faster, easier, *safer* coupling. You can't find a longer lasting, easier handling hose for use with air, water, oil and gases—even mild chemicals!



R/M makes a complete line of quality hose for special services, too. Whatever your requirements, you get more use per *hose* dollar from R/M.

Write for Bulletin #7075

R/M Puts the "Extras" in Conveyor Belt Design!

For the conveyor belt *engineered* for your particular job, investigate R/M's advanced developments in heavy duty belt design . . . constructions like extra flexible Ray-Man . . . which trains naturally, troughs easily . . . handles *fuller*, *heavier* loads even where small pulleys are required in low-head room installations . . . extra-cushioned Homocord, for unusually abusive shock loading . . . R/M Tension-Master for extra long lifts and high tensions. Each belt is mildew-proof and moisture resistant . . . and each is protected by the exclusive "XDC" Cover, R/M's *bonus* extra to greatly increase resistance to wear, tear, cuts and abrasion. *Specify* R/M Conveyor Belts . . . you *get* "More Use per Dollar."

Write for Conveyor Belt Bulletins

RM 715

BELTS • HOSE • ROLL COVERING • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

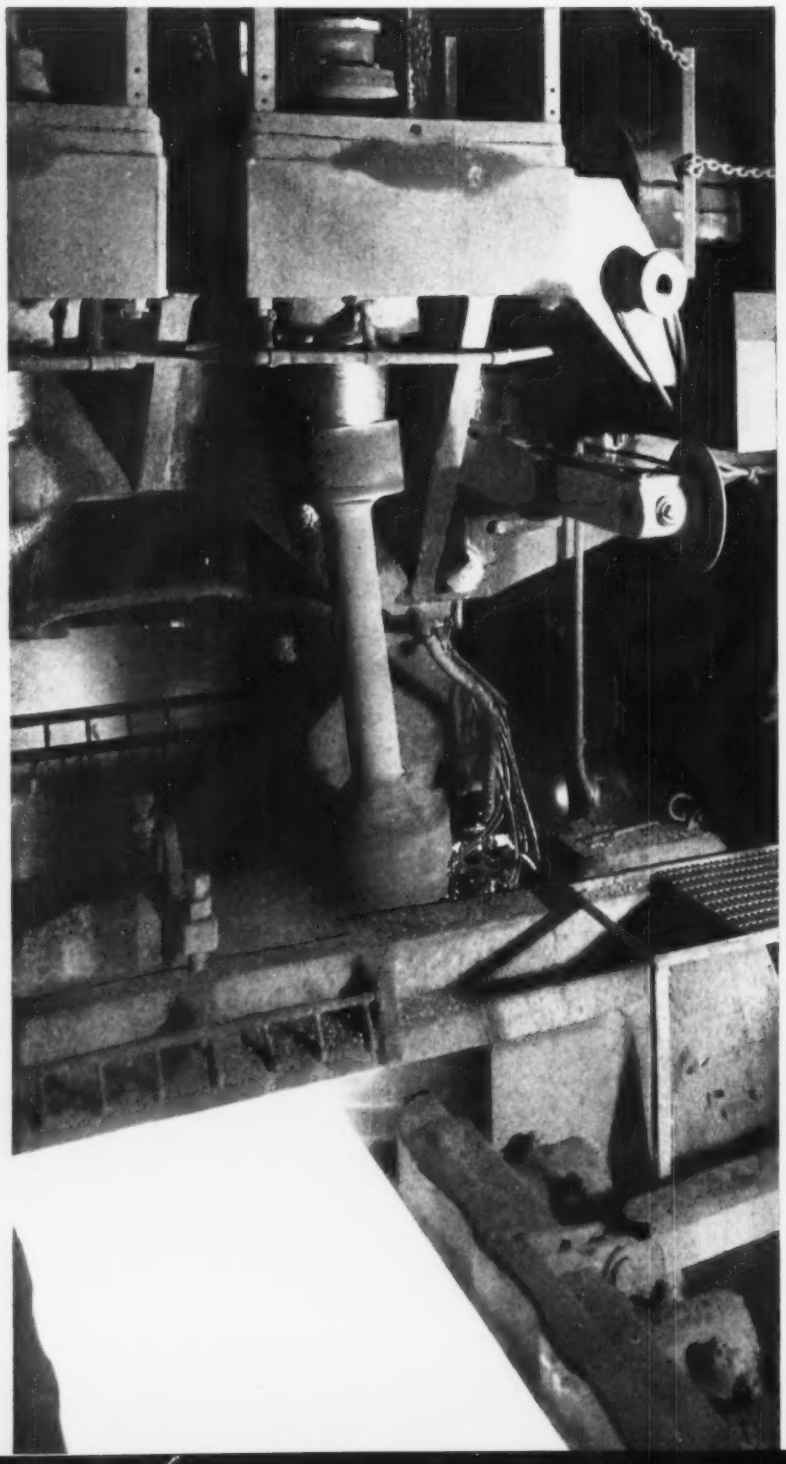
Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

WITH CARD PROGRAM CONTROL:

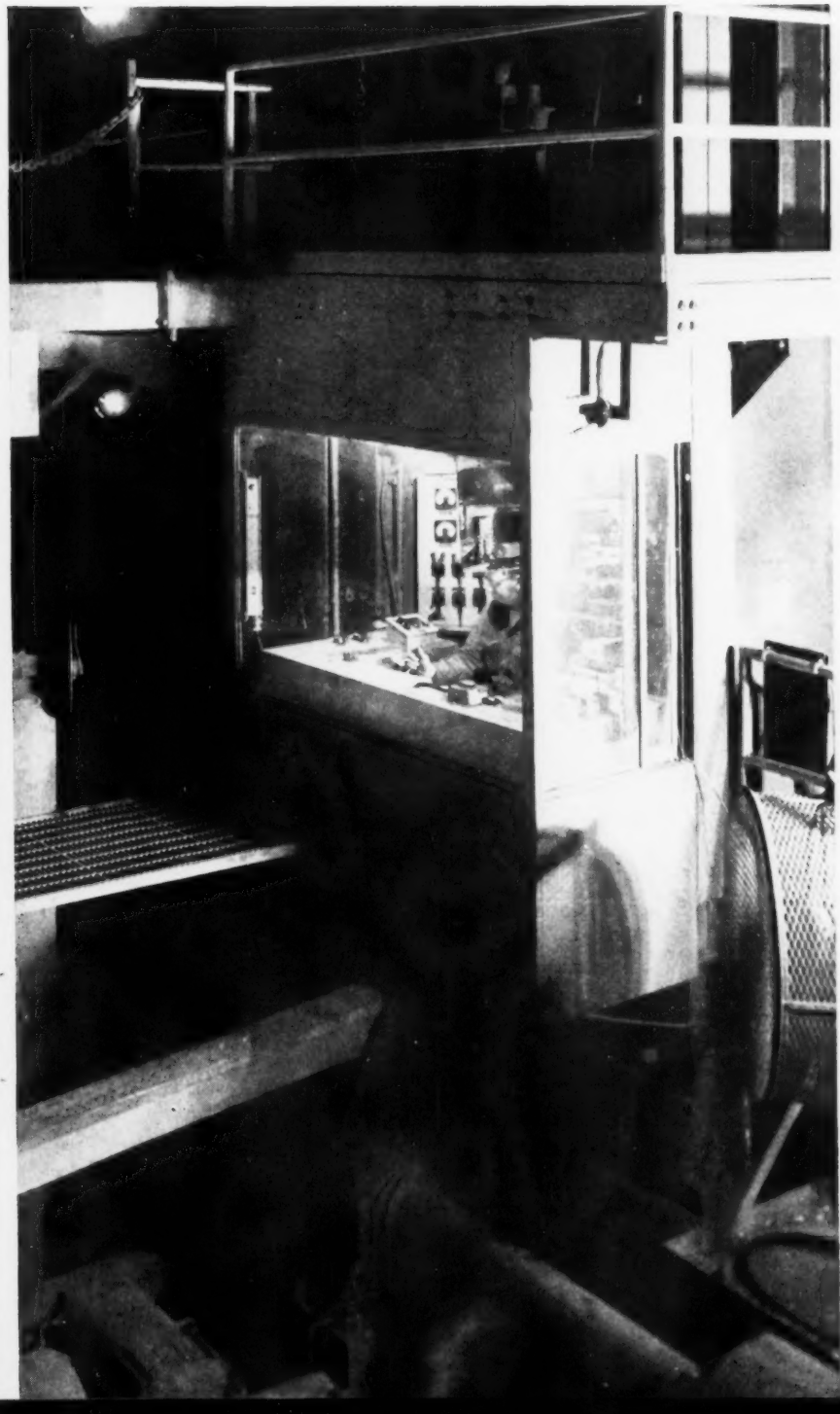
STANDARD BUSINESS CARD—for flexibility and compatibility with business accounting, industrial data logging and processing systems—is key to the General Electric program control system.

ACCURACY of the system is approximately 0.010 inches with maximum opening of 9.99 inches. Settings are provided every 0.01 inches. Above is control panel for the General Electric control system.

PUNCHED CARDS permit operator to maintain large number of optimum schedules for a wide variety of products.



Allegheny Ludlum gets higher quality with faster schedule changes, automatically



New General Electric punched card control on Allegheny Ludlum's Brackenridge reversing rougher is steel industry's first card programmed control system

For the first time in the history of the steel industry, a punched card system automatically programs and controls roll openings and mill speed. This newly developed General Electric punched card system provides closer tolerances and is presently in full operation on Allegheny Ludlum's Brackenridge reversing rougher. The system is designed to help eliminate errors in roll settings and speed and represents a new standard for quality control and process flexibility.

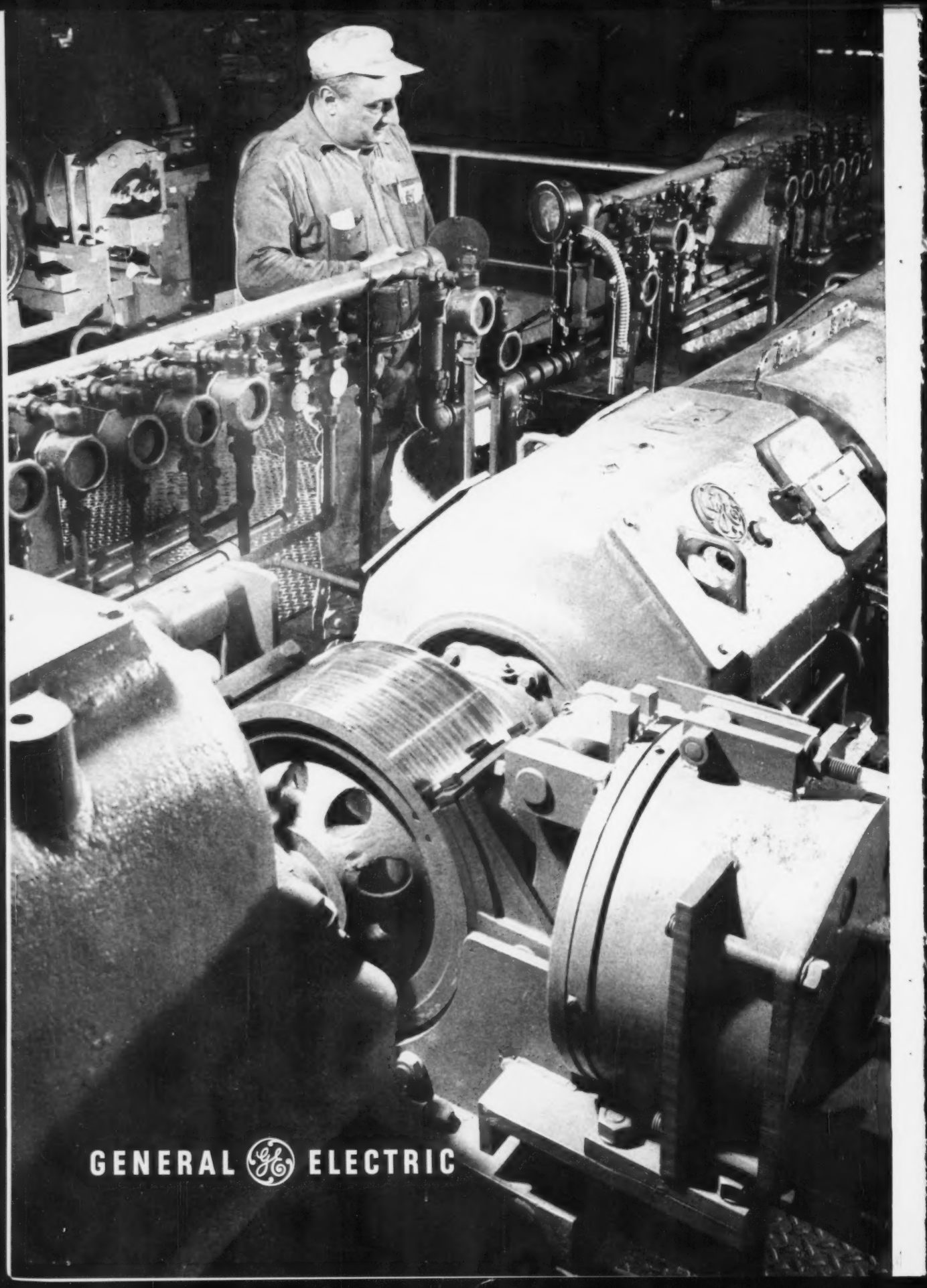
A 15 Pass Schedule and product data can be programmed into Allegheny Ludlum's roughing mill. The punched card control system automatically sets the screws and the top speed of the pass. The operator selects the desired card and inserts it in the "card reader". The operator then starts the pass with a start-stop push-button. For every pass, the screws are automatically set with the precision necessary for higher quality production.

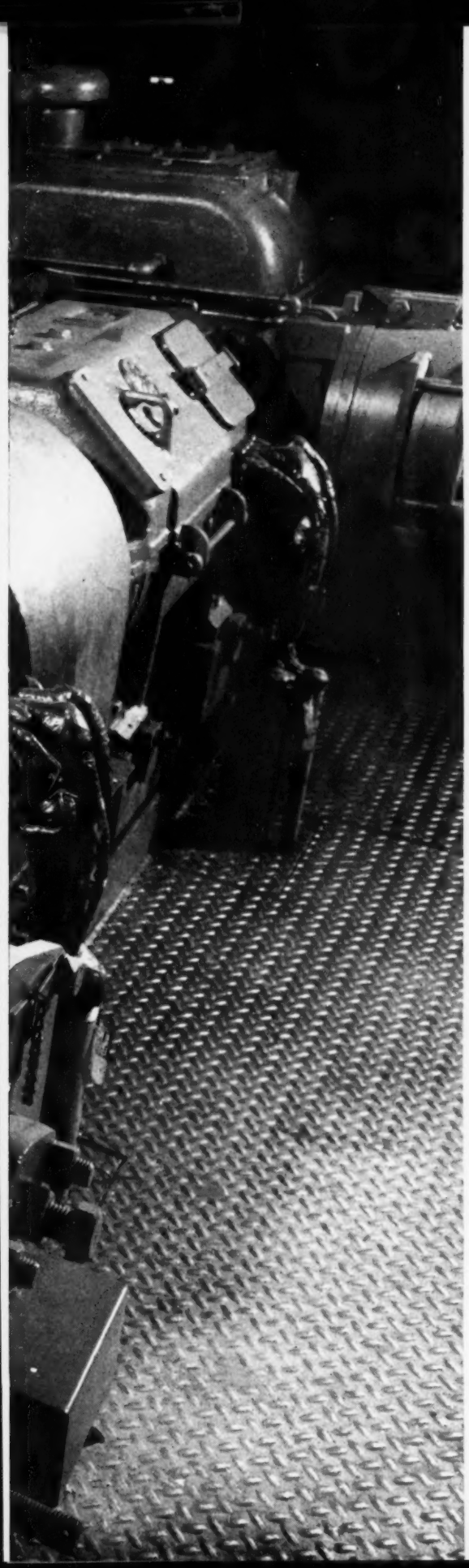
The Card Program Control system was designed and developed by the General Electric Company. Applied to other processes, the control principle promises greater process flexibility with higher quality control for the steel industry.

Get Complete Information on how a General Electric card program control system can benefit your operation from your nearest General Electric Apparatus Sales Office. General Electric Co., Section 659-115, Schenectady, New York.

Engineered Electrical Systems for the Steel Industry

GENERAL ELECTRIC


GENERAL ELECTRIC



Progress in Direct Current Drives . . .

NOW MD-600 Motors Meet AISE Standards In All Sizes

In steel mills, on cranes, on power shovels—on any application where severe operating conditions exist, General Electric's Armored Motors are on the job. ***In all frame sizes***—402, 602 through 624, MD motors meet or better the high standards of the Association of Iron and Steel Engineers.

Where minutes mean money—In the process industries, any "downtime" can cause staggering losses. MD-600 motors have that *added protection* that gives steadier production—fewer unplanned shutdowns.

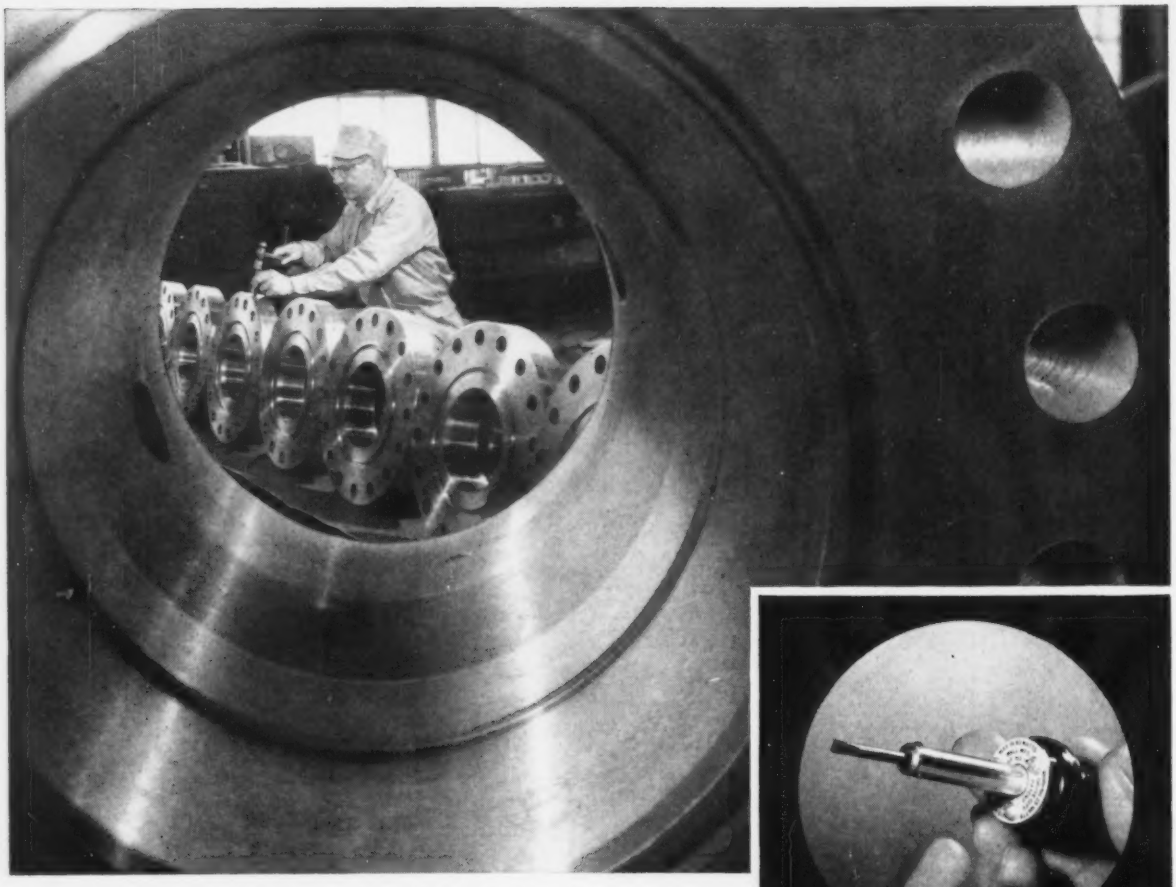
Class H insulated coils, standard in all MD-600 motors, give greater thermal protection, longer insulation life—an unmatched level of dependability. Insulation failure and motor roastouts have been virtually eliminated!

Specifically designed for the most rugged production applications, General Electric MD-600 motors provide high acceleration, deceleration and reversing to deliver peak horsepower faster and more efficiently. They will perform continuously under extreme strains of mechanical shock, high temperature and in the corrosive presence of dirt, steam and water.

Engineering help—If you would like to know more about the MD-600 motor line, we would be pleased to have a General Electric Industrial Specialist call on you. Or, if you prefer, we will send you copies of GEA-5654. Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania. 811-4

Progress Is Our Most Important Product

GENERAL ELECTRIC



Heavy duty, 145 pound steel casing flanges (above) work under enormous pressures in controlling rates of flow from oil and gas wells. Miniaturized soldering iron (right), weighing but 1 ounce without electric cord, utilizes 5/16 inch O.D. steel tubing for section of body.

One channels a torrent...one carries a current
Columbia-Southern Trichlor vapor degreases both

Vapor degreasing is cleaning more parts, more assemblies in more metals plants every month . . . and doing it with an economy and low-reject efficiency unmatched by older cleaning processes. Vapor tank units, conveyorizing equipment and solvents have all improved tremendously over the past several years. And nowhere is the kind of improvement that makes vapor cleaning the ideal process seen more clearly than in Columbia-Southern's exclusively developed, neutrally stabilized Trichlorethylene.

This unique stabilizer, completely different in chemical composition from the highly alkaline amines used in many other solvent formulations, keeps pH high for extremely long periods. Users experience no parts corrosion due to solvent decomposition under light, heat, oxygen, acids, moisture, repeated distillation. You get more actual degreasing from each drum of Columbia-Southern Trichlor. And you'll find it a more versatile solvent, too. Chips, grinding and buffing compounds, graphite, grease, coolants, quenching and lubricating oils are removed almost instantly from materials and parts as dissimilar as those pictured above. Parts emerge clean, dry, ready for immediate inspection, further machining, painting or plating.

Columbia-Southern Trichlor wins the nod from both purchasing and operating standpoints. The solvent's nonflammability, high vapor density and low boiling point allow less waste, more safety. Made to the most rigid standards of controlled quality by one of the world's leading merchant producers of chlorine, Columbia-Southern Trichlorethylene helps you realize all the advantages of the vapor degreasing process.

Take your choice of tank car, tank truck, or drum delivery . . . the Columbia-Southern identification brings you uniform quality with each shipment. Order or re-order today from the nearest Columbia-Southern sales office or from your solvents distributor.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati • Charlotte Chicago • Cleveland • Boston • New York St. Louis • Minneapolis • New Orleans Dallas • Houston • Pittsburgh • Philadelphia San Francisco

IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

Productive Maintenance in action...

AT COLUMBIA-GENEVA STEEL*

*division, U.S. Steel Corporation

accent on maintenance keeps largest steel mill in West productive— minimizes downtime

Planned maintenance is nothing new at the Geneva, Utah, works of Columbia-Geneva Steel. Since 1944 this steel facility, largest in the West, has used a comprehensive maintenance program covering small equipment. Recently this program was extended to include coverage of all large ***critical*** equipment and to take advantage of ***Productive*** Maintenance protection.

Geneva Works engineers working in conjunction with the General Electric Company's Salt Lake City Service Shop, prepared an analysis of critical rolling mill equipment and associated parts protection.

This survey became the basis for the 5-Step ***Productive*** Maintenance program, now in operation, helping to assure continued rolling mill production by minimizing downtime.

TURN PAGE FOR COMPLETE STORY OF *Productive Maintenance* AT WEST'S LARGEST STEEL MILL

GENERAL ELECTRIC

Productive Maintenance in action... CONTINUED

How Columbia-continuity

STEP 1 — COMPLETE NAMEPLATE DATA GATHERED

Geneva Works began its *Productive* Maintenance plan by making a complete equipment inventory, and establishing a record system which is now a basic part of their program. Well edited record cards include a description of all electrical equipment such as this large slabbing mill drive motor at left: rating, application, serial number, manufacturer, purchase order number, inventory number, and cost information.

STEP 2 — EVALUATION FOR ROUTINE MAINTENANCE MADE

The Geneva Works soon discovered some equipment could be excluded from the plan. Only items included were those on which a *Productive* Maintenance program would pay, like this important D-C circuit breaker. In some cases it was found to be cheaper to repair or replace the entire piece of equipment after it broke down, rather than use high-cost manpower to inspect and maintain it.

STEP 3 — ROUTINE OPERATING CONTROL SYSTEM ESTABLISHED

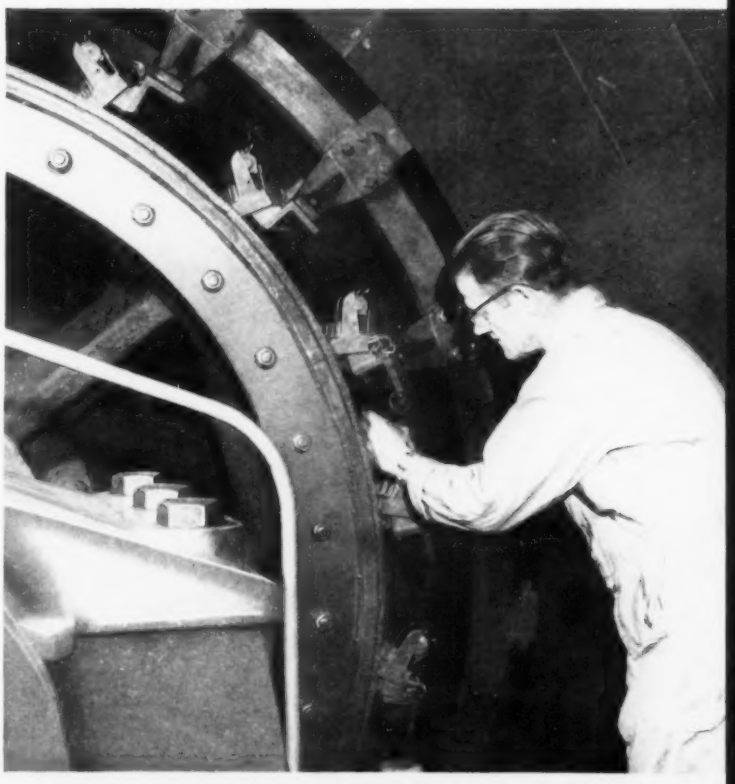
A work order program was established and renewal parts recommendations secured. Utilizing data gathered in the first two steps, this Columbia-Geneva maintenance specialist and foreman strike an inspection balance between "too often" and "not often enough." Estimated turnover rate for each part, procurement time, and cost determine minimum stock level. Parts are purchased from original supplier when reorder signal indicates need.

Geneva Steel protects production with *Productive Maintenance*

STEP 4 — EVALUATION FOR CRITICAL MAINTENANCE MADE

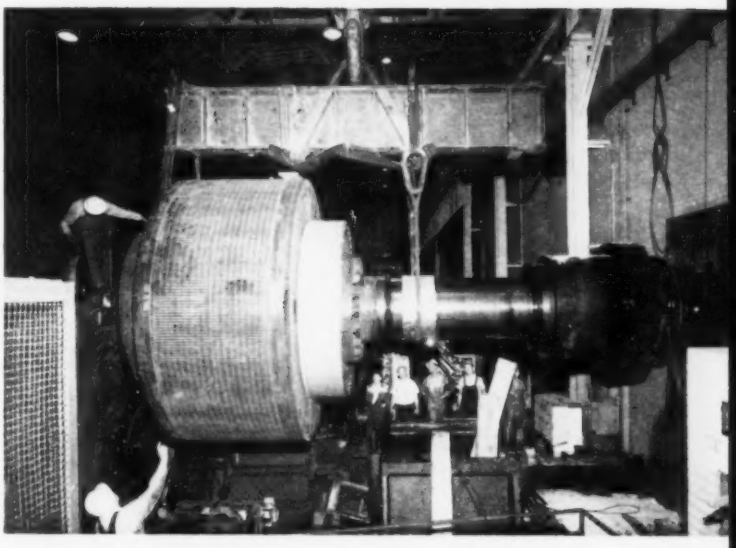
Geneva Works has adapted its *Productive* Maintenance program to take full advantage of this step, considered by many to be the most worthwhile step in terms of dollars and cents saved. Equipment is considered critical if its failure could directly or indirectly interrupt or delay production. The 5000-hp strip mill motor, at the right, is an example.

How much protection is needed for each piece of key equipment is determined by the following procedure: calculate repair time needed for a major failure if no critical parts are stocked, if some are stocked, if all critical parts are stocked, or if complete unit is stocked. Next, determine the cost of repair and inventory for each possible condition. Total this information to determine "failure cost." Analyze total cost for each condition to determine what you should stock for "best" protection.



STEP 5 — CRITICAL MAINTENANCE PROGRAM ESTABLISHED

This step minimized downtime costs by stocking of critical parts and by planning overhauls far ahead. It paid off at Geneva Works recently with the installation of this spare 3500-rpm armature in a 7000-hp reversing-rougher mill motor during a scheduled downtime. This removal of equipment for overhaul at times most favorable to production narrows the gap between actual and theoretical maximum output. Columbia-Geneva now has a 5-year *Productive* Maintenance program under way which will plan all maintenance by steel production operation rather than by machine. This will result in greater savings to Columbia-Geneva.



Turn page and see how you can profit from Geneva Works' example

YOUR ANALYSIS of key equipment protection, with the cooperation of your nearest General Electric Service Shop, makes *Productive* Maintenance pay off — as it did at Columbia-Geneva.

To reduce equipment breakdowns, and maintain high production continuity in your plant . . .

General Electric will help set up your *Productive Maintenance* program

Call in G.E. for help in starting your *Productive* Maintenance program. Your nearest G-E Apparatus Service Shop or Sales Office will work with you in setting up a program for your plant. General Electric can help you in five ways:

Complete data on parts: Ask your G-E Maintenance Specialist to supply you with proper identification of all renewal parts for each piece of your electric equipment. This will complete your basic records.

Routine inspection plans: By looking over your system, he can help you organize your inspection trips, estimate attention needed by equipment, offer upkeep guidance.

Renewal parts inventory: He can help tailor a renewal parts plan specifically designed for your plant's needs, guide you in establishing a system of parts inventory.

Critical analysis for best protection: Your G-E specialist can tell you just how long repairs will take for critical equipment, give you an estimate of repair costs. Determining "best" protection will be greatly simplified.

Assessment of critical equipment: He can help you estimate condition of key equipment, schedule men and machines at the nearest G-E Service Shop to help you during planned overhauls.

General Electric Company
Apparatus Sales Division, Section B801-20
Schenectady 5, New York

☐ Please send me the detailed manual (GEA-6087) on setting up a *Productive* Maintenance Program in my plant.

☐ Please have a Maintenance Specialist call on me.

☐ I would like to schedule a showing of G.E.'s film *"Productive Maintenance."*

Name _____

Position _____

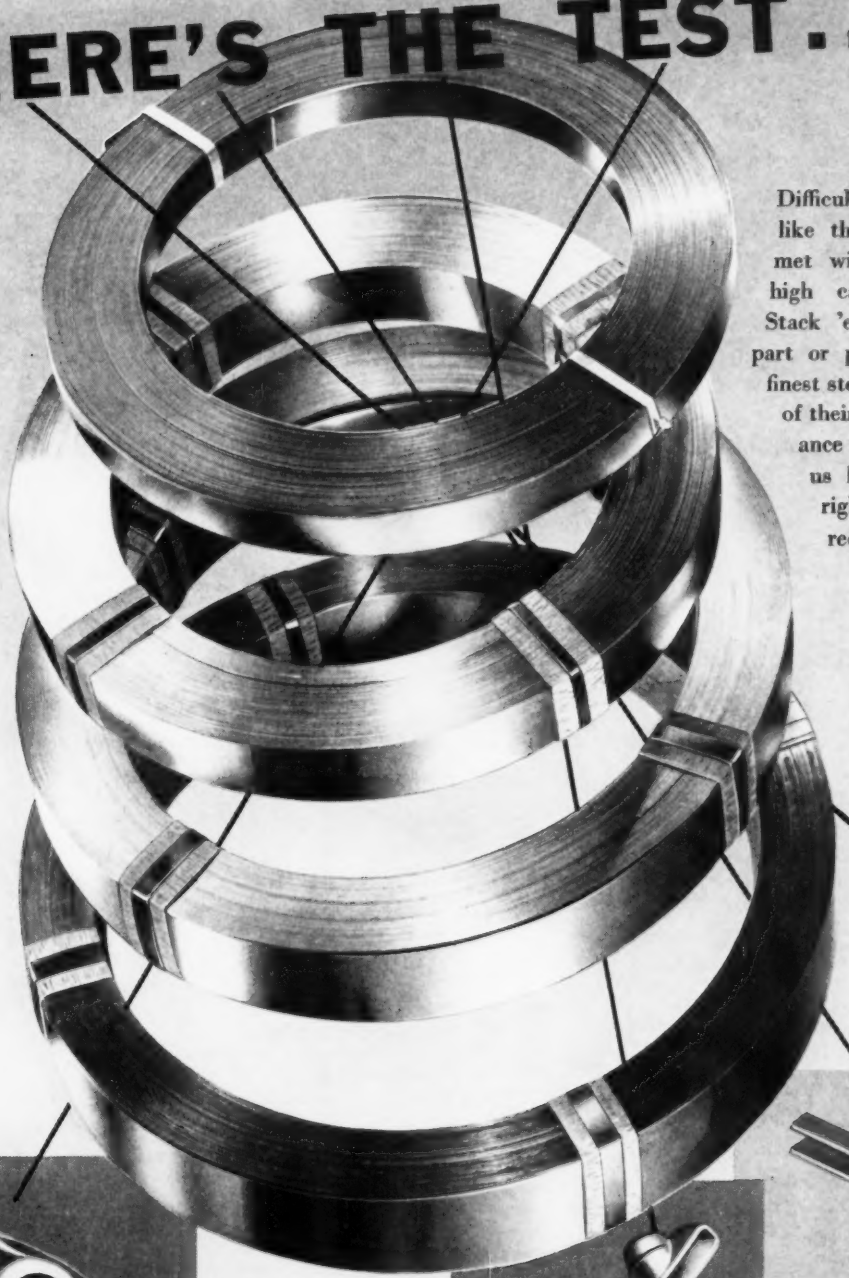
Company _____

City _____ State _____

Productive Maintenance —as vital as production itself!

GENERAL ELECTRIC

HERE'S THE TEST . . .



Difficult forming operations like these are successfully met with Wallace Barnes high carbon strip steels. Stack 'em up against *your* part or product . . . These finest steels will convince you of their all-around performance and workability. Let us help you select the right type for your requirement.

Blanked on 45° Angle

Thirteen Steps Progressive

Three Drawing Stations

All Flanging One Operation

WALLACE BARNES STEEL DIVISION

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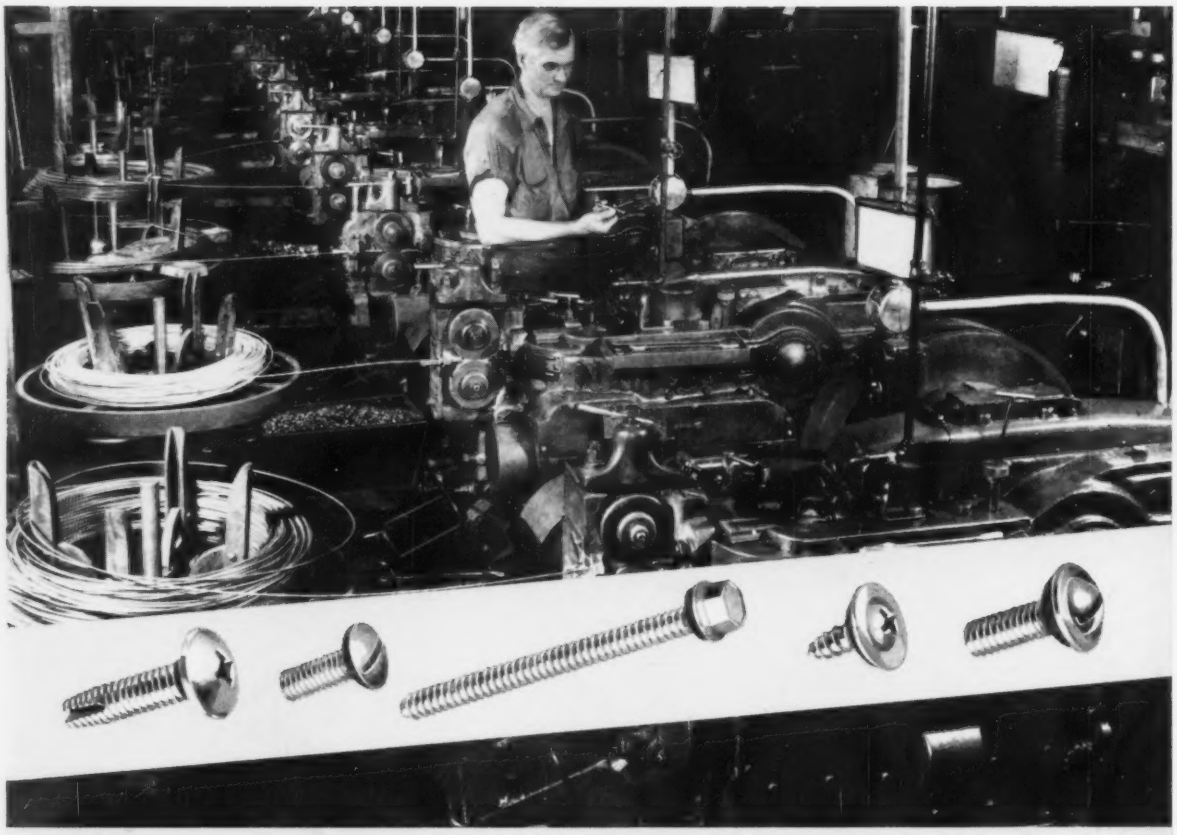
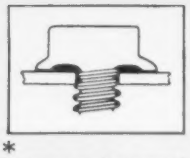


Townsend Cold-Forges New *Tuff-Tite** Line On National Headers



* Neoprene washer trapped under head of TUFF-TITE fastener seals hole—acts as cushion.

Townsend Company, New Brighton, Pennsylvania, 141-year-old manufacturer of rivets and fasteners, has been relying upon National Headers to cold-forge most of its output for the past 26 years.

Townsend continually applies its vast experience to the up-to-the-minute fastener requirements of its customers. The company's operating people find the rigidity, ruggedness and overall ability of National Headers particularly valuable in cold-forging *by the millions* Townsend's new line of TUFF-TITE leakproof fasteners.

If *you* need to make metal parts faster, stronger and at lower cost, may we work with you? Send us your prints and samples, or better yet, accept our invitation to come to our plant. *Here we can approach tomorrow's new and better ways of forging metal parts in the light of methods and ideas which our people are already developing and testing today!*

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

As filled capsules are inspected at Abbott Laboratories, North Chicago, Illinois, the girl suits the speed of the Jeffrey feeder to her requirements with the hand rheostat.

FLOW CONTROL is possible within wide limits, simply by changing feeder's amplitude of vibration.

A way to do what "can't" be done...
JEFFREY Vibrating Feeders

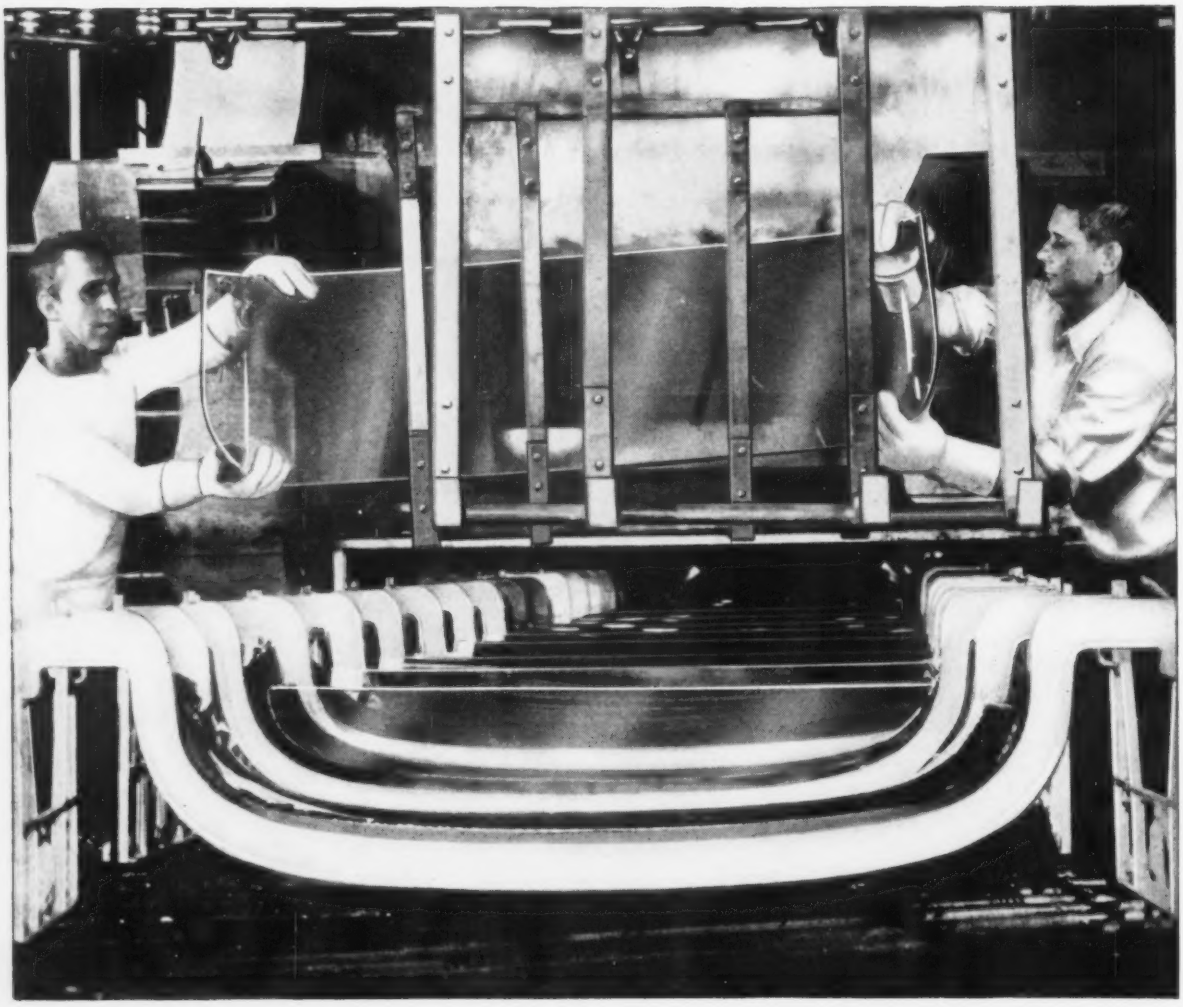
Jobs once considered too costly, too hazardous, or just plain impossible are being done with Jeffrey electric vibrating feeders . . . handling a tremendous variety of materials, densities from 4 to 400 pounds per cubic foot, one micron in size to four-foot cubes, a few ounces to 2,000 tons per hour.

With Jeffrey feeders, the operator has instant and absolute control over the flow of material. This control may be manual or automatic, depending upon equipment that follows, to insure optimum loading. Thus a plant and its workers can produce at top efficiency.

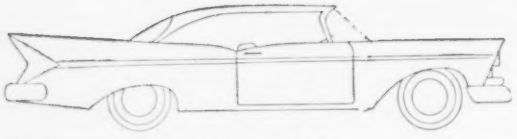
Jeffrey engineers are expert in applying vibrating equipment to all types of processes, and are available to help solve your feeding and conveying problems. Catalog 870 describes these feeders. The Jeffrey Manufacturing Co., 925 North Fourth St., Columbus 16, Ohio.

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

JEFFREY



Greater visibility, trimmer lines in new car styling... thanks to GAS



With nearly 7,000,000 cars being produced annually, the increased use of glass has demanded major production improvements in the manufacture of new panoramic windshields and back-lights.

Since the forming of the intricately curved glass is done at a temperature at which glass is soft and can be bent, the production process challenged heat process engineers to design new automatic equipment capable of mass producing these large precision glass pieces.

Selas engineers, working with the nation's leading glass manufacturer, discovered that Gas could produce the proper time-temperature cycle demanded by this process, efficiently, quickly, reliably. The flat glass is conveyed under radiant Gas burners which bring the glass quickly up to bending temperature and allow the shaping of windshields, with reproducible uniformity, at high production rates.

The production of this wrap-around windshield is another example of the contributions modern Gas equipment is making to American manufacturing. If you have an operation demanding precise process heating, call your local Gas Company's Industrial Specialist and discuss the economies and results you, too, can get with modern Gas equipment. *American Gas Association.*

See Playhouse 90 with Julia Meade on CBS-TV. Watch local listings for time and station. Sponsored by your Gas Company and the Gas Industry.

THE ONE BEST WAY TO SELECT HEAT TREATING EQUIPMENT

Talk it over with the most experienced furnace experts you can find

That is exactly what we can offer you at Lindberg. A design and engineering staff concerned only with the development of equipment for applying heat to industry. This staff produces the most complete line of such equipment in the industry—heat treating furnaces, melting furnaces, ceramic kilns, high frequency induction units; big ones, small ones, electric or fuel-fired, built in our own plant or field-erected.

Whatever your requirements Lindberg's staff will study them without prejudice recommending the correct equipment to fill them whether you need only a simple heat treating furnace or a specially designed and developed installation to answer an exceptional problem in a newly-efficient way. You can be sure you have the right answer when you leave it to Lindberg. Get in touch with your nearest Lindberg Field Representative. (See your classified telephone directory or write us direct.)

This Lindberg Carbonitriding and Carburizing Furnace (electric or fuel-fired) is one of the most widely-used heat treating units in the world.

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ENGINEERING COMPANY

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. . . how else could this job be handled so well?

Through exclusive features like these a Gerlinger fork lift truck enables each operator to multiply "manpower" and give you a new concept of profitable mass-handling:

- Exclusive Floating-Type Boom Action – faster, friction-free lift
- Counter-active Weight Distribution – better traction and maneuverability
- Pivotal Mounted Steering Assembly – stabilized load on any road
- Heavy-Duty Steel Channel Frame – bonus years of reliable service
- Maximum-Power Torque Converter Drive – smoother operation, less wear

If you move and stack loads between a few hundred pounds and twenty tons, look to the combined Towmotor-Gerlinger line to meet the most diversified specifications. This great new combination brings you the most complete range of fork lift truck capacities available from one source. More extensive service to match it, too.

Get catalog describing the lift trucks that will do the best job for you. Address: Gerlinger Carrier Co., Dallas, Oregon.

Leaders for 38 years in building Fork Lift Trucks and Carriers

TOWMOTOR
THE ONE-MAN-GANG
-GERLINGER

Gerlinger Carrier Company, Dallas, Oregon is a subsidiary of Towmotor Corporation, Cleveland, Ohio

NEW Black & Decker
No. 16 NIBBLER

NEW Black & Decker
No. 16 SHEAR

Two New B&D Tools speed up sheet metal jobs!

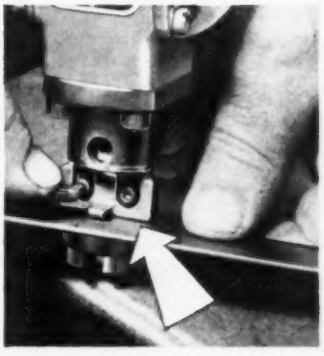
Faster, lighter, easier handling, POWER-BUILT and packed with features

Whether you need the speed of shears or the more precise performance of nibblers—you'll find a lot to like in the new Black & Decker No. 16 Shear and No. 16 Nibbler.

By actual test, they're faster and longer-lived than competitive tools. Their lighter weight means easier handling. Their centrifugal fans give cooler running. Each has exclusive construction features to stand up under the shock of sheet metal cutting.

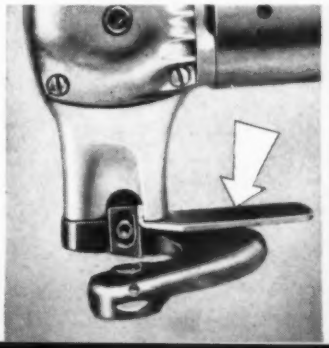
Try these new tools at your nearby Black & Decker distributor. There's a No. 12 Shear, too, for heavier work. For full details on new features, write to: THE BLACK & DECKER MFG. CO., Dept. 0906, Towson 4, Maryland. (In Canada: 80-86 Fleet Street, E., Toronto 2, Ontario.)

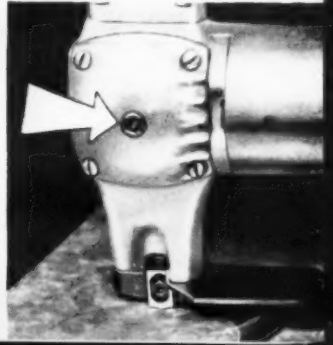
Look Under "TOOLS-ELECTRIC" in Yellow Pages



UP TO 3 TIMES FASTER than competition, new B&D Nibbler has twice the life, 20-30% less weight, reversible punch. Adjustable stripper plate (left), smaller diameter (right) are extra features.

50% FASTER than competition, new B&D Shear has one-third less weight than closest competitor, lasts much longer. Deflector plate prevents curling of material. Adjusting screw allows quick positioning of blade.

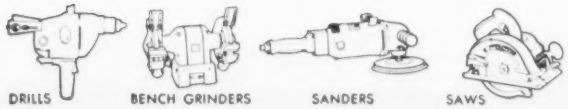




Leading Distributors Everywhere Sell

B&D Black & Decker®

Portable Electric Tools—Power-Built to set the pace



DRILLS BENCH GRINDERS SANDERS SAWS

WHO TAKES THE RAP?

When you place an order for metal stamped parts, any number of things can go wrong. Probably no one knows this better than you. When deliveries are late or quality misses the mark, who pays the *real* penalty? You do! Don't you?

Sure, you can reject the job and insist that defective parts be corrected or replaced. But who *absorbs* the costs of delays and inconveniences? *Isn't it you?*

Or, if you are forced to let inferior stampings slip through, because production schedules are pushing you, who takes the rap then? The stamping plant has only one displeased customer . . . that's you! But, how many will you have?

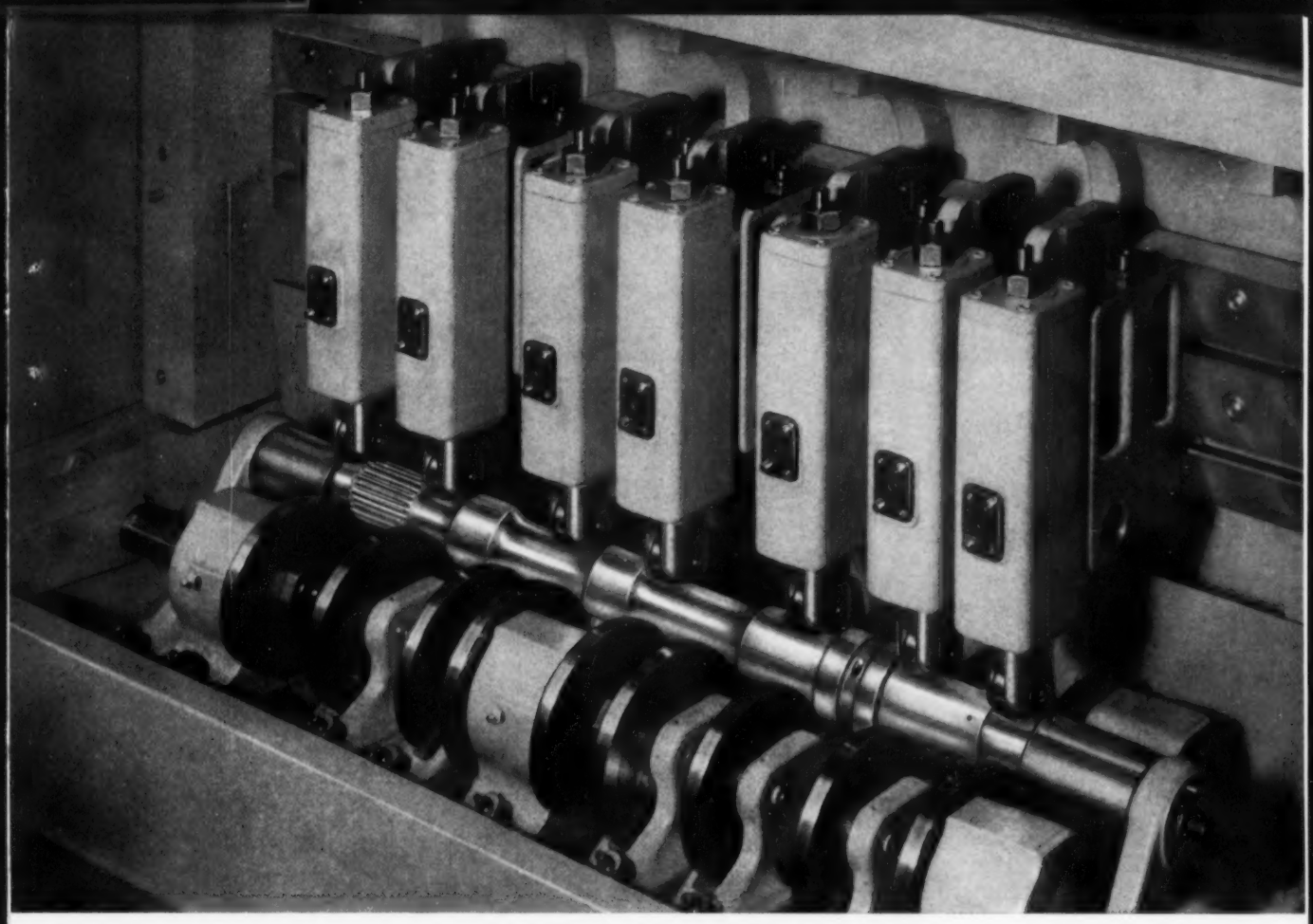
Why take such chances? You don't have to with Crosby. Take quality, for example. It's maintained at the highest standard at all times. Crosby quotations are made on that basis. Prices which are fair to customers and fair to Crosby assure top-grade production. Deliveries are made as scheduled. Promises made are promises kept.

When you "take it to Crosby," no one takes the rap!

THE CROSBY COMPANY **195 Pratt Street, Buffalo 4, N. Y.**

METAL STAMPING SINCE 1896 · THE CROSBY COMPANY · BUFFALO, N.Y.

OFFICES: Chicago • Cleveland • Detroit • New York • Philadelphia



How to eliminate *your* shaft distortion problems

Distortion during hardening is a major production problem.

The Gleason No. 140 Rolling Quench Machine corrects this difficulty, because the quenching and straightening operations are performed at the same time. Because cold straightening is eliminated, valuable production time and expense are saved, and the quenched parts have less residual stress.

Shafts cannot distort because they are rolled under pressure throughout the quenching operation. The operator puts the hot part on the lower rollers and starts the machine. From there on, the quenching operation is automatic. Rolling speed, pressure, and oil flow are pre-set to suit the work that is being quenched.

The automatic quenching cycle saves operator time, and gives *uniform* results for all parts quenched. The pre-set metallurgically correct oil flow gives uniform hardness.

The Gleason No. 140 Rolling Quench Machine is equally suited for small or large quantities. It accommodates shafts $\frac{9}{16}$" to 4" in diameter, 6" to 10" in length, with integral cams or shoulders up to 8" diameter. Tooling can be arranged to hold parts on diameters or centers. Unusual shapes can be handled with additional tooling. Write for further information.

The Gleason No. 140 Rolling Quench Machine also handles multiple quenching of short shafts.

GLEASON WORKS

Builders of bevel gear machinery for over 90 years

1000 UNIVERSITY AVE., ROCHESTER 3, N.Y.

I dreamed my husband got a promotion for insisting on

Republic bolts and nuts*

(with a bow to MAIDENFORM)

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

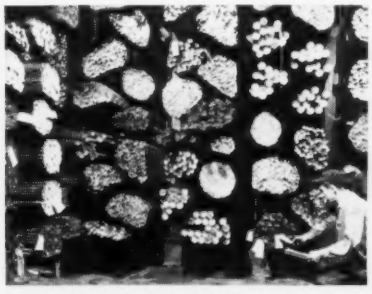
Men Who Know Fasteners Recognize Republic Quality

Fasteners represent such a small part of final product cost that good judgment demands insisting on the best. Anything less is a gamble with trouble for all concerned.

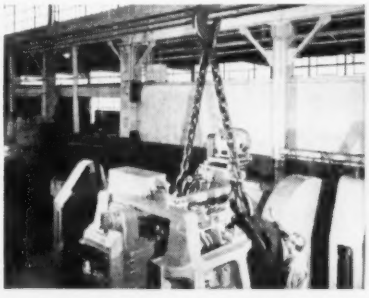
Since all bolts and nuts are made to the same set of standards, the only way to be sure of the best is to know your fastener maker. And experienced production men have learned to know and respect the uniform high quality of Republic Bolts and Nuts.

Superior quality is more than a matter of meeting a set of finished-product standards. It can't be inspected into the product. It must be built in through every step of manufacture. This Republic is able to do through integrated production control from iron ore to finished fasteners. Nothing is left to chance or outside error. The result is year-in, year-out excellence, in any quantity, every time.

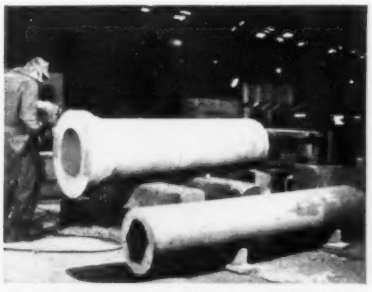
So don't just order fasteners; *select* Republic and be sure of the best. Over 20,000 standard and 8,000 special types and sizes are available to meet practically any assembly requirement. Send coupon for descriptive literature.



MEN WHO KNOW MACHINING operations are available to you through Republic's Union Drawn Steel Division. They can help you take maximum advantage of higher speeds and feeds made possible by the excellent machinability of Republic Cold Finished Steel Bars. Moreover you get outstanding strength and finish. For facts, send coupon.



RECOGNIZED PERFORMANCE of Republic Chain Slings is backed by proof-testing of every assembly before shipment. Free from kinking and fraying, they are available in all designs in carbon and alloy steels and wrought iron grades—along with matched accessories for every lifting requirement. Send coupon for chain sling book, ADV-719PL.



HIGHEST QUALITY CASTINGS start with Republic Chateaugay Pig Iron—and often offer savings over comparable cast-steel parts. The uniformity of exclusive Chateaugay Pig Iron simplifies melting and pouring procedures and reduces design, labor, and reject costs. Mail coupon for data on Republic Chateaugay, the low-phosphorus, copper-free pig iron.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-3426
3104 East 45th Street · Cleveland 27, Ohio

Please send me further information on:
☐ Fastener Products ☐ Chateaugay Pig Iron
☐ Cold Finished Steel Bars
Please send me: ☐ Chain Slings Book ADV-719PL.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

NEW!

WATERBURY FARREL SLOTTER

"Model 5"

DELIVERS UP TO 51,840 (BURR FREE) BLANKS PER HR....

SLOTS STANDARD & SPECIAL SCREW HEADS, FERROUS OR NON-FERROUS BLANKS #6 TO ¼" DIA., UP TO 2½" LONG, AT VARIABLE SPEEDS FROM 60 TO 864 PER MINUTE.

ONE "Model 5" Outproduces TWO Earlier Type Slotters

The speed and work range of this completely new Waterbury Farrel slotter make it more productive than a *pair* of earlier type slotters which used indexing dials and saw-into-work sequence.

The "Model 5" has long and short run versatility, too. Its simplicity and rapid set up make it economical for short runs while its high speed pays extra dividends on long runs.

Inexpensive Tooling

The only tooling required is a saw and burr-remover blades made inexpensively from spring steel. One dial, furnished as standard equipment feeds the above range of blank diameters. Special dials can be furnished for other blank diameters.

WF-25

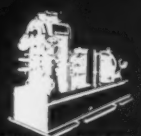
WATERBURY FARREL
Foundry and Machine Company
WATERBURY, CONN.

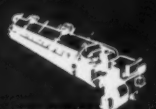
Branch Offices: Chicago • Cleveland • Millburn, N. J.

For further information, write for free bulletin or contact your nearest WF representative, today.

Bolt, Nut & Screw Machinery

Power Presses


Rolling Mill Machinery


Wire Mill Equipment

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WATERBURY FOUNDED 1851 FARREL

HOUGHTON Gives You "VETO" Power Over RUST

RUST VETO M.P.—multi-purpose base. Mixes with water. solvent, oil. Dependable, economical and fire safe.

RUST VETO 266—combination rust preventive, cleaner, fingerprint neutralizer. Displaces water, residue, acids. For temporary production-line protection.

RUST VETO 372—a polar type preventive for long term indoor storage. Withstands 30-day humidity cabinet test at 100°F.

RUST VETO 344—produces fast drying polar-active asphaltic film. Used for long-term outdoor protection of metal.

RUST-PROOFED IN SECONDS!

Immediate mail-order delivery of this clear, dry film that positively seals moisture out. Clean, handy and effective as only Houghton can make it.

Price $15.24 per case (1 doz. 12 oz. cans) f.o.b. Philadelphia, Pa.

Indoor, outdoor, in carefully compounded formulas or a multi-purpose base for mixing in your own shop . . . Houghton gives you complete veto power over all types of rust problems. There are a dozen principal types . . . all dependable, effective and economical.

And if you've a new problem, the Houghton man can put laboratory and field research in motion to break it down for you quickly.

E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

RUST-VETO

. . . a product of

E. F. HOUGHTON & CO.

PHILADELPHIA • CHICAGO • DETROIT • SAN FRANCISCO

Ready to give you on-the-job service . . .

Got a die casting problem?

THEN CONSIDER CRUCIBLE NU-DIE V DIE CASTING DIE STEEL. IT'S THE OUTSTANDING DIE STEEL — AND IT'S QUICKLY AVAILABLE FROM LOCAL CRUCIBLE WAREHOUSE STOCKS.

Crucible NU-DIE V is a particularly good choice for aluminum and magnesium die casting dies, or long run zinc dies or die inserts. It resists washing or heat checking. And every piece of Crucible NU-DIE V is ultrasonically inspected to insure that the steel you buy is of the highest die steel quality.

Press forged blocks are regularly stocked at Crucible warehouses, in a wide variety of sizes. And there are dozens of other tool steel grades for you to choose from.

Crucible is the only specialty steel producer *fully integrated to the point of use.* That means control and responsibility from raw material to warehouse delivery to you.

STOCKS MAINTAINED OF:
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, Hy-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

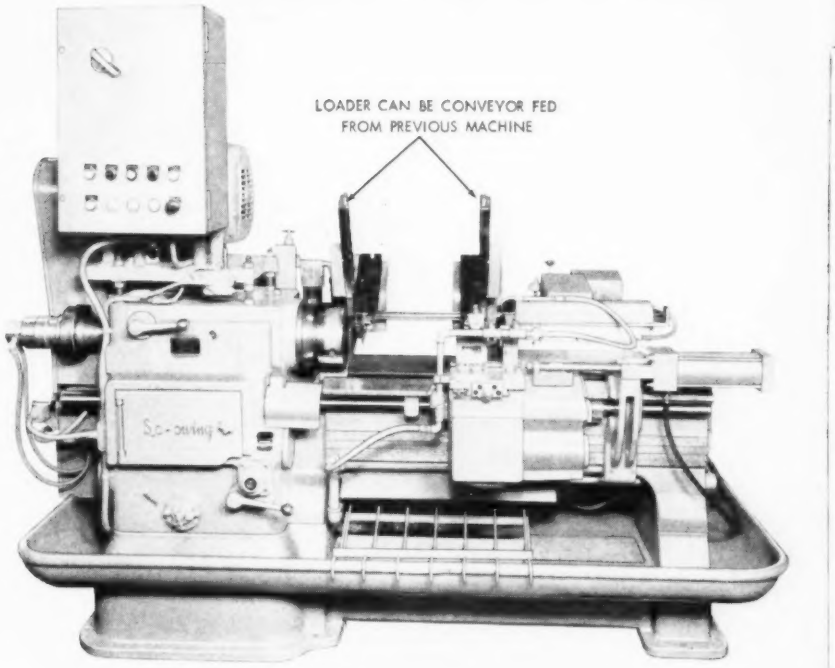
CRUCIBLE WAREHOUSE SERVICE

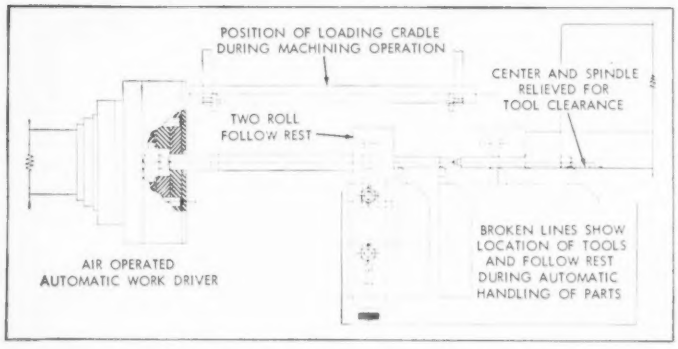
Crucible Steel Company of America

General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Grand Rapids Harrison • Houston • Indianapolis • Los Angeles • Milwaukee • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.

HAVE WE GOT NEWS FOR YOU!

DOES AUTOMATIC HANDLING SPEED PRODUCTION OF MOTOR SHAFTS ON Lo-swing Lathes ?





Typical machining operation wherein loader and lathe operate on a continuous automatic cycle.

SURE DOES! Witness this one. A fast-cadenced, mechanically-operated loader that will handle slim diameter shafts from 5½ to 24 inches in length. All the operator does is keep filling that tall, large-capacity chute with work pieces. He can attend four or five machines without strain. The loader and the Lo-swing Lathe, with its continuously revolving spindle, do *all* the rest.

HOW . . . is a trade secret, but we'll let you in on it if you're really interested. Frankly, it truly amazes us after thirty years of Automation experience.

IF YOU are turning small shafts, like electric motor shafts, pump shafts, textile machine shafts and rolls, twist drill blanks, etc., etc. . . . We sure have news for you!

Phone, wire or write for the facts and figures.

SENECA FALLS MACHINE

ENGINEERED FOR PROFIT

SENECA FALLS MACHINE CO.
Seneca Falls, New York

Automatic and Semi-automatic Lathes • Automatic Drilling and Centering Machines
Automatic Work Drivers • Production Tracer Lathes • Automation and Work Handling Devices • Special Production Machinery

MicroRold® 430

the general utility STAINLESS STEEL

Since 430 meets military specifications, why not investigate this grade for your product

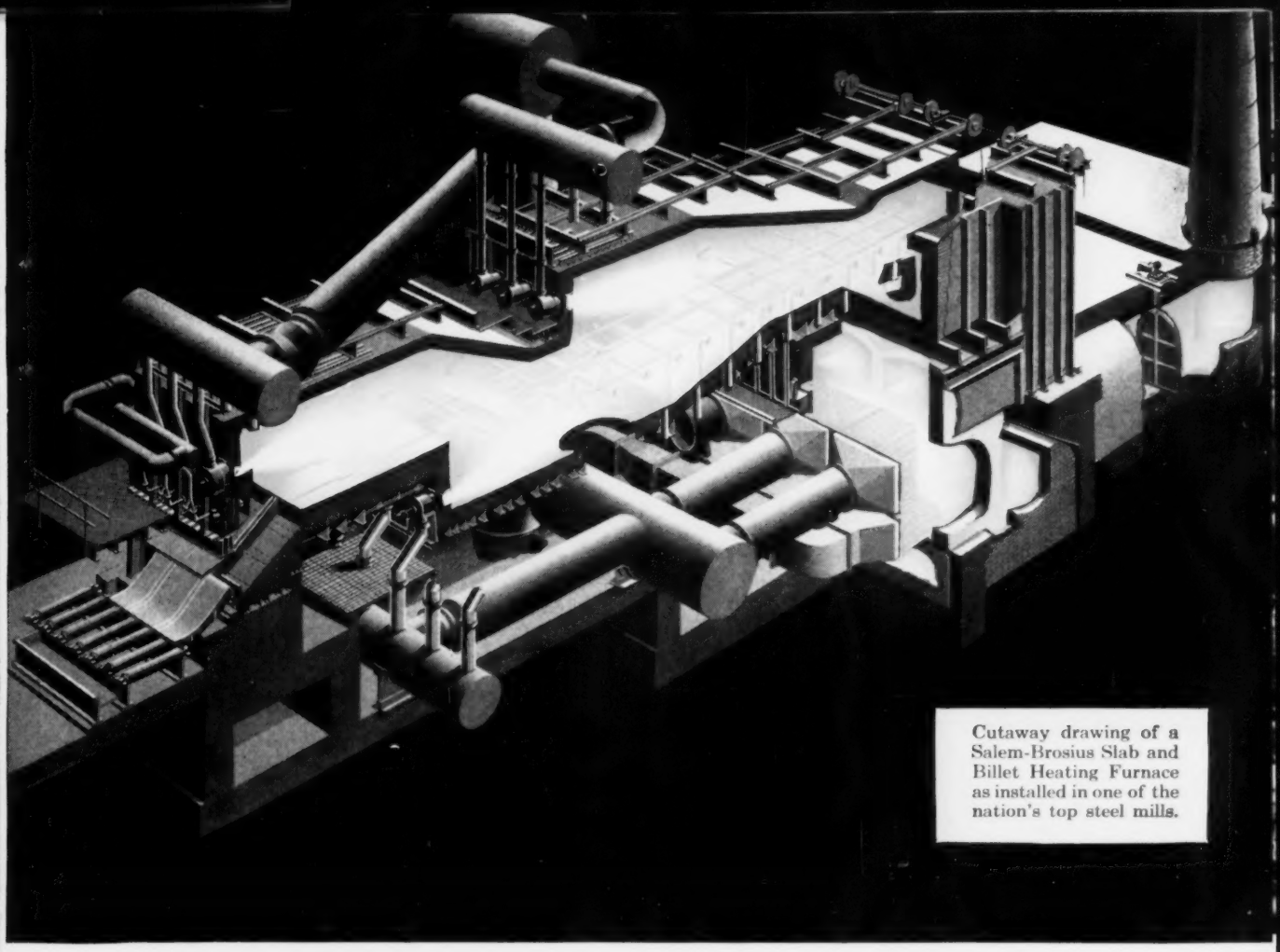
This straight chromium stainless grade possesses desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that are also of value in many civilian applications. More than 50% of all stainless applications could satisfactorily employ 430 stainless as an economical and practical material. Type 430 stainless costs 10¾ cents per pound less than the 18-8 grade. Some of our customers are already saving more than $215 per ton using our MicroRold 430 stainless sheet. Why not investigate the possibilities of this general utility 430 stainless.

Send today for your copy of our 24-page booklet, "MicroRold 430 Stainless Steel Handbook."

***MicroRold* 430 sheets** are available up to 48″ wide as thin as .010″, and up to 36″ wide as thin as .005″ in commercial finishes and tempers.

Washington Steel *Corporation*

6-L, Woodland Avenue, Washington, Pa.



Cutaway drawing of a Salem-Brosius Slab and Billet Heating Furnace as installed in one of the nation's top steel mills.

In this Salem-Brosius furnace better steel products are born

All over the country, steel producers are turning to Salem-Brosius Pusher-Type Slab and Billet Heaters, because they have come to know that these furnaces will produce maximum tonnages of evenly heated, accurately temperatured steel at the lowest fuel consumption rate. The triple-fired furnace shown above features accurately controlled heating and soaking zones, heavy construction, recuperators for fuel economy, dual gas-oil fuel system, low maintenance cost, and many other advantages. These assure positive, automatic control of furnace output and heating quality.

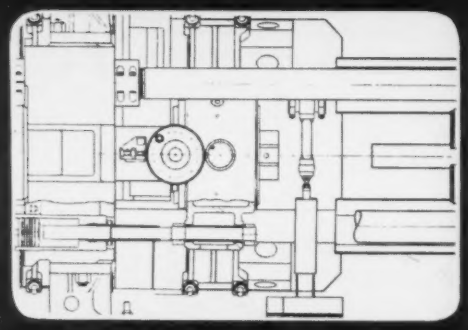
And the efficiency, economy, ease-of-operation, and trouble-free service this furnace affords are typical of all the furnaces Salem-Brosius builds. Whether you require this or any other heating or heat treating furnace, Salem-Brosius offers equipment designed, engineered, and built not merely as a furnace but as a heating machine. You can purchase these furnaces as complete installations—equipped with all controls, piping and wiring—ready to operate. Write to us.

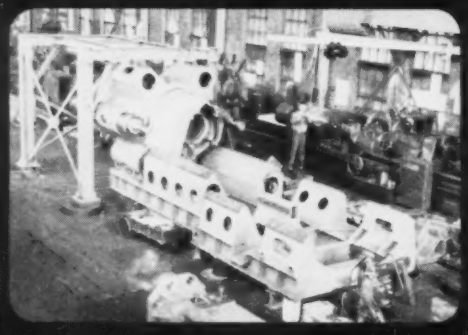
SALEM-BROSIUS, INC.

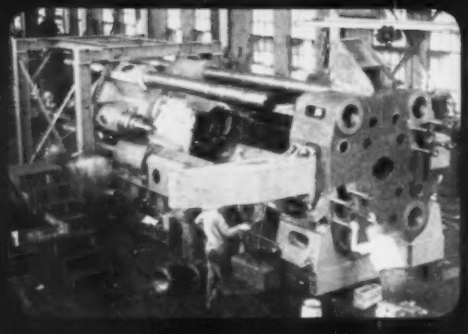
CARNEGIE, PENNSYLVANIA

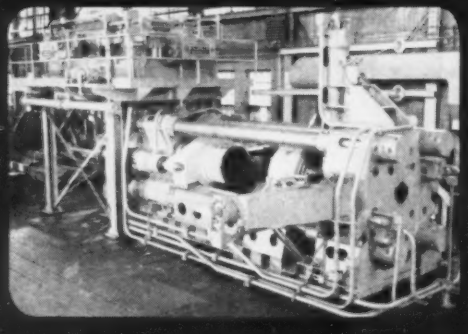
In Canada: Salem Engineering Limited • 1525 Bloor Street West, Toronto 9, Ontario

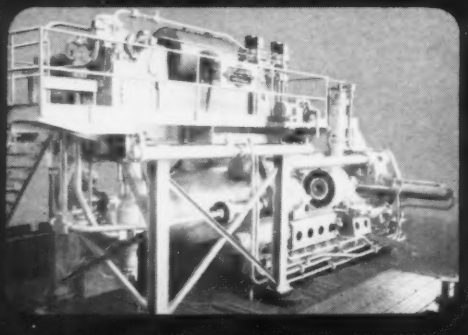
SPECIAL MECHANICAL EQUIPMENT • INDUSTRIAL HEATING FURNACES • MATERIALS HANDLING EQUIPMENT

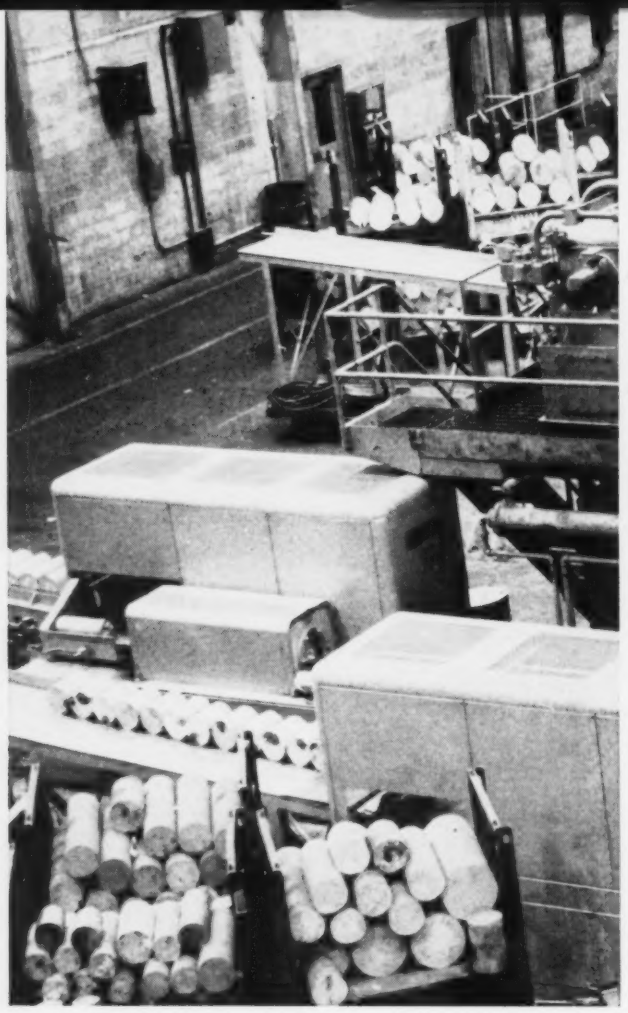










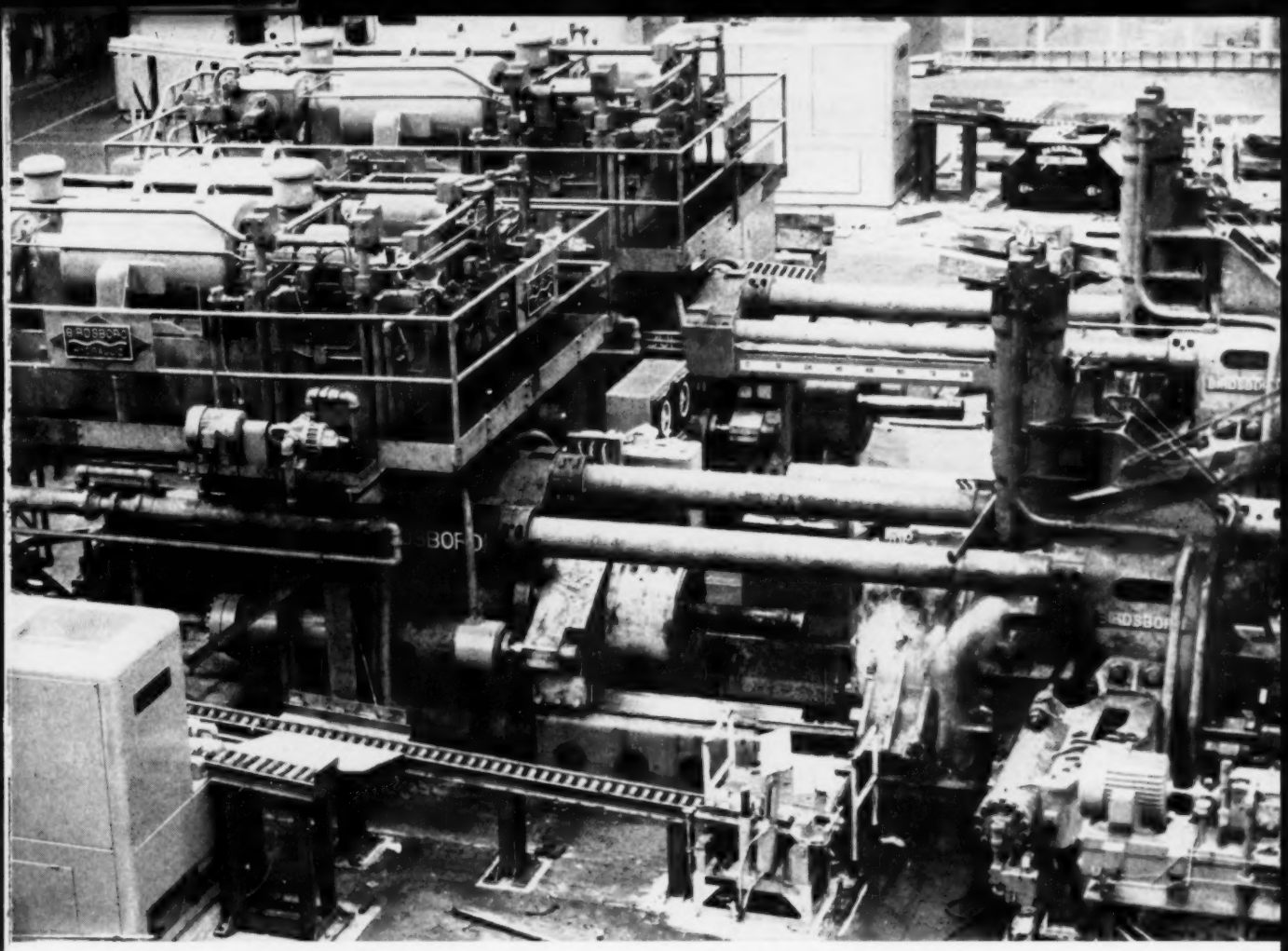


EXTRUSION . .

gets big boost

• At each step in design and building of Extrusion Presses, Birdsboro has found new ways to add production economies in the fast-moving extrusion industry. From the blueprint stage through construction, special engineering advances make extra savings possible. In *time* for instance: 15 to 20 minutes per die change is saved through special transverse die slide; also, dead cycle time is reduced 20 seconds. These are just samples of advances made in a recent Birdsboro installation at Kaiser Aluminum's Halethorpe plant.

Here are a few of many stages from blueprint to assembly in the construction of the extrusion presses pictured above.



Modern, self-contained, oil hydraulic four-column aluminum extrusion press designed and built by Birdsboro for Kaiser Aluminum's plant in Halethorpe, Md.

. . *Metalworking's fastest growing method from* **BIRDSBORO** *engineering*

Here are details as reported in "Kaiser Aluminum NEWS":

"Four new presses, costing over $1,000,000 have been built for us by Birdsboro Steel Foundry and Machine Company. Three of them are 2,750-ton, self-contained, oil hydraulic presses 34½ feet long, 14½ feet high. They are engineered to make extruded shapes from billets of 8 to 12 inches in diameter and up to 32 inches in length. Birdsboro shipped the first one July 11, 1956, and it took five railroad cars to carry the load.

"Heaviest new unit in the line is a 3,500-ton water hydraulic press, also built by Birdsboro."

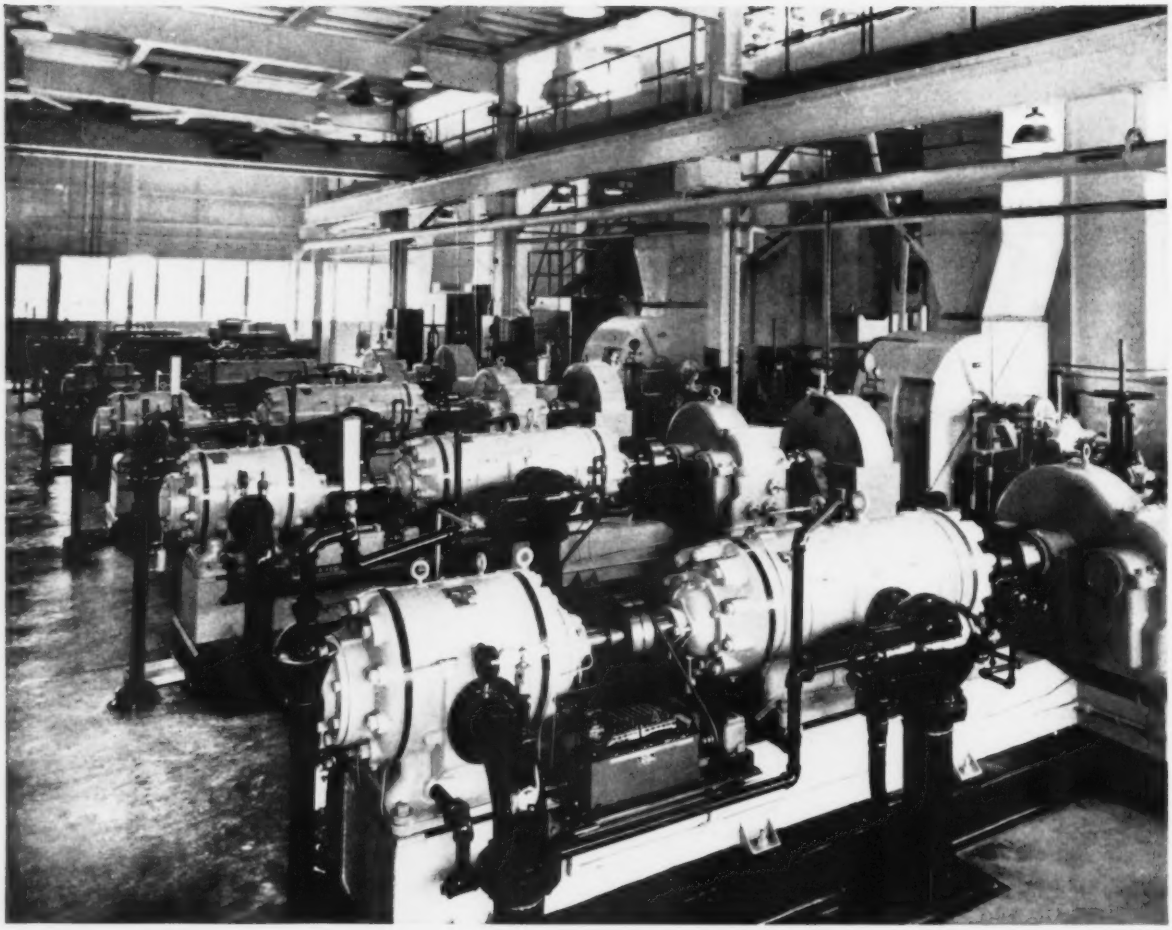
Birdsboro can supply any type of hydraulic press, including 1,000 to 12,000-ton presses for extruding aluminum, magnesium, copper, titanium, brass and steel. A call to Birdsboro now may mean important design advantages for you in your next press order. Main office and plant: Birdsboro, Pa., Subsidiary: Engineering Supervision Co., 120 W. 42nd St., New York 36, N. Y. District Office: Pittsburgh, Pa.

BIRDSBORO HYDRAULIC

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES (Metalworking and Extrusion) • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel



4 YEARS - - 25,000 HOURS OPERATING PERFORMANCE!

This is just one of many production records set by Fuller Rotary Compressors—in this case by each of six machines installed in a leading aircraft plant. The only maintenance or replacement necessary over this period was installation of high and low pressure blades. Bearings held up 100%.

Fuller rotary compressors shown are four C-300-300H, steam turbine drive, capacity each 1248 to 1805 c.f.m., with speed ranges of 450 to 650 r.p.m., 125-lb. gauge pressure, and two electric motor drive, capacity each 1663 c.f.m., at 600 r.p.m., 110 lb. gauge pressure.

Your plant, too, can take advantage of the many cost-saving advantages of Fuller rotary compressors; such as smooth airflow, lack of vibration minimum of moving parts, adaptability to any production setup, and the advantage of "one man" operation.

Write today to Fuller Company and get complete data on how Fuller rotary compressors can give you more air power at less cost.

Fuller

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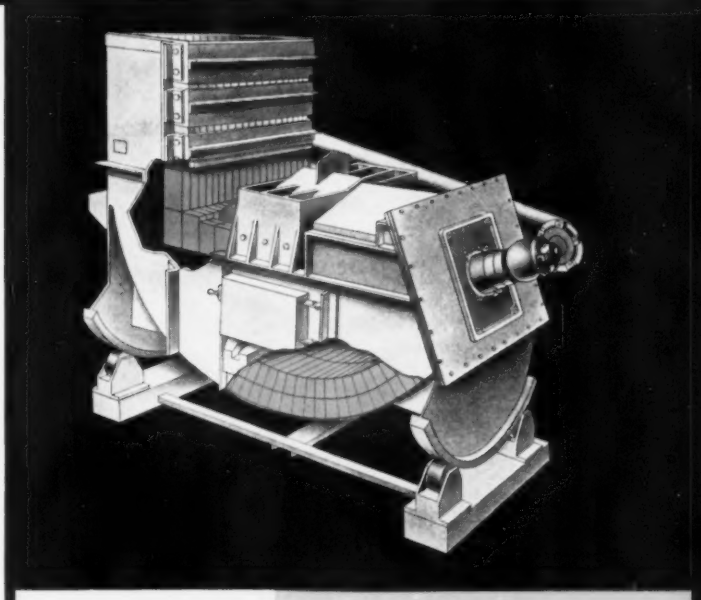
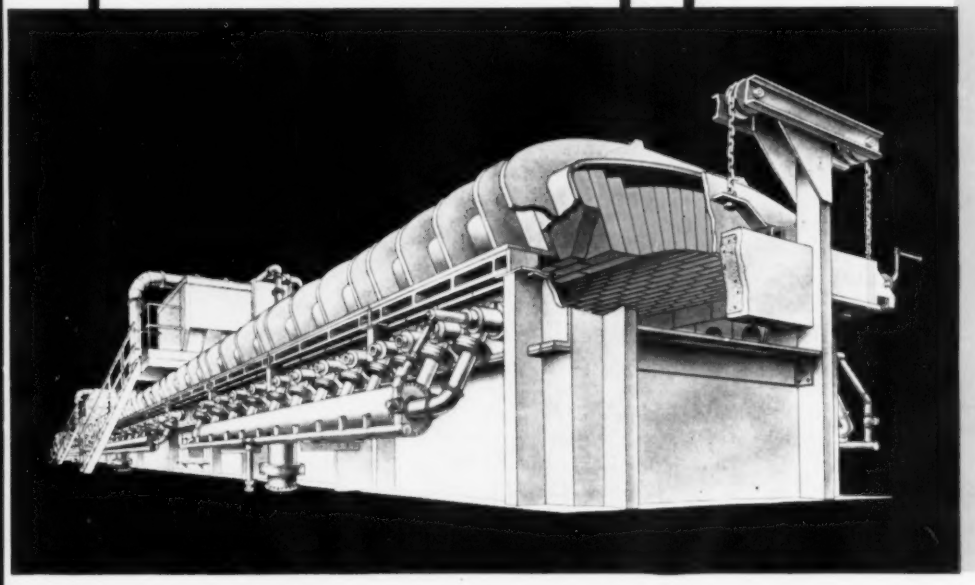
PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

Why B&W Allmul Firebrick withstand punishing service in furnaces like these



Direct-fired reverberatory furnace for melting brass, aluminum, and iron. For longer refractory life, B&W Allmul Firebrick are used to line the bath and arch.



In this type of furnace for continuous high speed heating of strip for welding into pipe, temperatures in excess of 3000 F are common and the atmosphere is contaminated with iron oxide. Because of their resistance to spalling and metal penetration, B&W Allmul Firebrick have set new standards for refractory life in bungs, burner blocks and recuperators.

B&W Allmul Firebrick stand up under extremely high temperatures at continued high rates of operation because they are produced from electrically melted mullite grain by a highly efficient process. These top-quality brick have high hot-load strength, high resistance to spalling, good volume stability and a melting point of 3335 F.

They are practical from a cost standpoint for a wide range of applications in the ferrous and non-ferrous metal industries. Illustrated on this page are a butt-weld furnace as well as a direct-fired reverberatory furnace. Other services are direct and indirect-arc electric furnaces, air furnaces, furnace hearths subject to iron oxide scale attack, crucible melting units and furnaces melting many non-ferrous metals and alloys.

Your B&W representative can show you how B&W Allmul can lower your refractory costs in many heavy-duty services. Consult him or write for Bulletin R-34A, giving data on B&W Firebrick for exacting services.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
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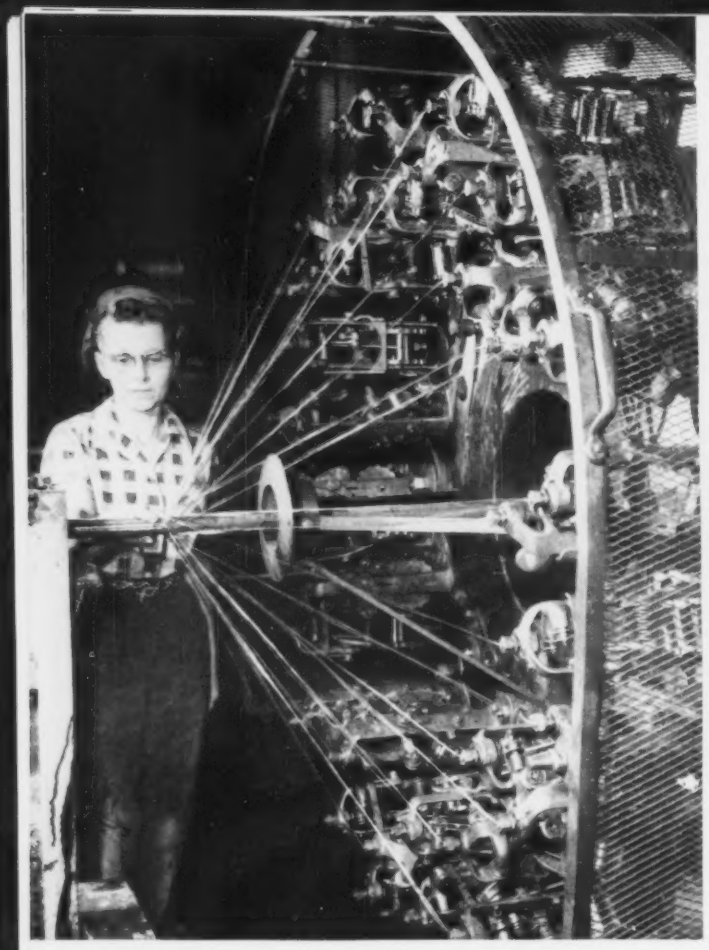
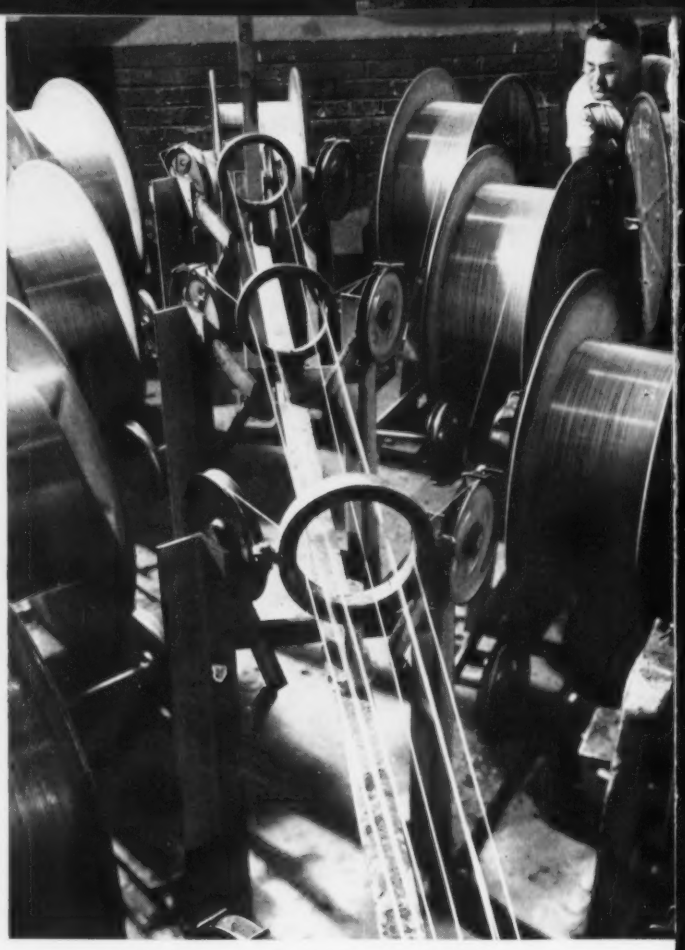
WORKS: AUGUSTA, GA.



B. F. Goodrich Company braids multiple strands of steel wire into intricate sinews around rubber tube to help control and resist tremendous internal pressures required of flexible hydraulic hose. Wire such as supplied by Johnson has tensile strengths ranging from 240,000 to 400,000 psi.



Firestone Tire and Rubber Company uses only high tensile steel wire of exacting tolerances in building tire beads. Rapidly entering the bead machine in parallel —three to fifteen wires wide, depending on strength specified—the wires are coated with rubber. Clean bronze finish on Johnson wire assures proper rubber adhesion.

The best names in rubber use Johnson wire for strength and safety in tires and hose

The rubber industry has a sound reputation for producing quality products in advance of its needs by use of imaginative research—painstaking development of production methods—careful selection and testing of component materials.

Goodyear—Firestone—U.S. Rubber—B. F. Goodrich—Thermoid and others have established their names over the years by giving the general public and industry alike—strength, safety and durability in products such as long lasting pneumatic tires and tough pressure hose.

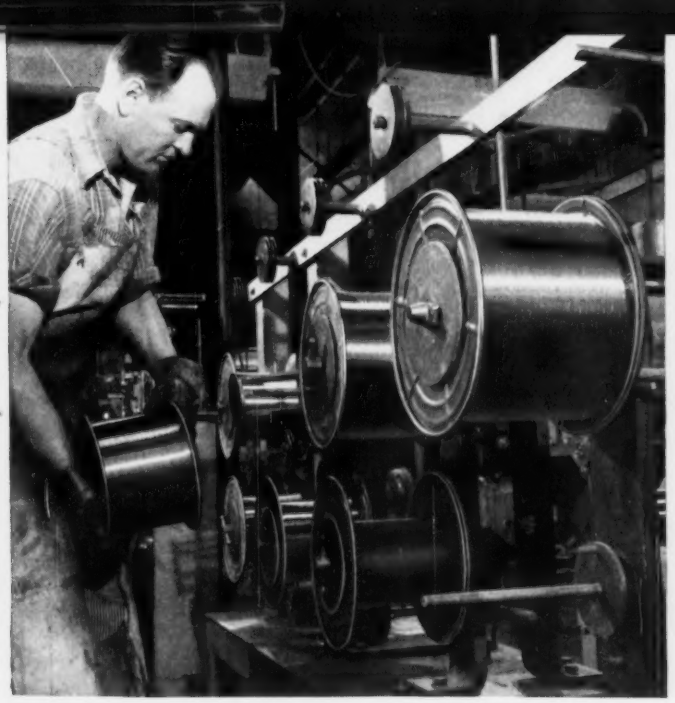
These two products owe their strength in part to the fine steel wires hidden inside them. For it is high-carbon steel bead wire which gives a pneumatic rubber tire—no matter what its size or job, the strength demanded by modern vehicles. Similar wire gives pressure hose its strong sinews which enable it to withstand working pressures as high as 10,000 psi—bursting strength may be three to four times as great.

Take the case of tire bead wire which Johnson supplies to every major tire manufacturer in the country. It is precision-drawn from special high-carbon rods to .037″ in diameter with a tolerance of only .002″—so fine that a 750-pound reel contains 39 miles of wire. Yet, a single strand exceeds 290 pounds of breaking strength equal to a tensile strength of 270,000 psi.

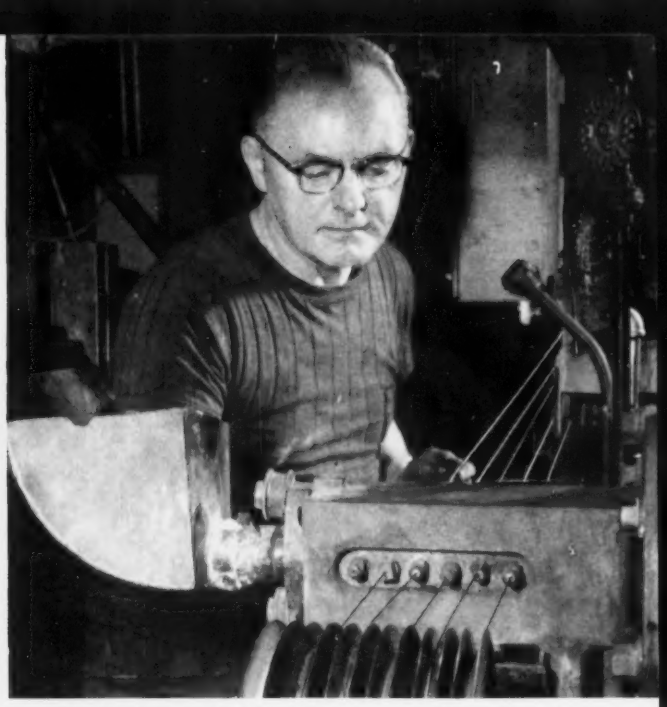
Also the wire must present a clean, unbroken surface and have a good and uniform bronze finish. This finish makes possible tight adhesion between the wire and the rubber surrounding it.

All these qualities contribute to the tire bead strength, help assure the safety of those who ride for work or pleasure on pneumatic tires.

Another special wire made by Johnson for the rubber industry helps rubber hose contain enormous pressures demanded by modern industrial applications. This reinforcing wire is drawn from selected high-



Thermoid Western Division of Thermoid Company has cut wire rewind loss to ½ of 1% by use of Johnson Discard-a-Spool which eliminates overlaps and tangles, protects wire quality in shipment. The one-way disposable spool weighs only 28 ounces vs 200 ounces for standard spool—slashes tare weight 14 times.



United States Rubber Company wires tires for strength on this bead building machine. The strength comes from the steel wire bead in the edge of each tire. Johnson makes special high-carbon steel wire—.037″ in diameter with tolerance of only .002″ for U.S. and other major tire companies.

carbon steel in diameters ranging from .008″ to .020″ and has exceptional dimensional accuracy—tolerance is plus or minus .0005″.

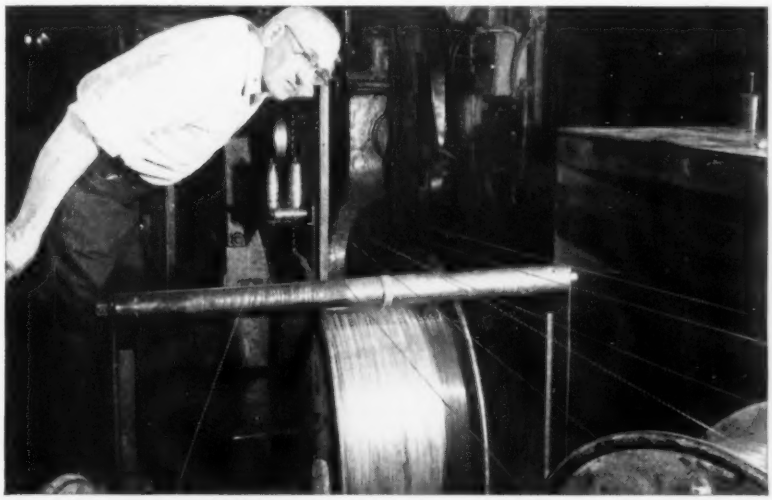
Johnson hose reinforcement wire is supplied with a special liquor finish to provide maximum adhesion of steel to the rubber which fills the interstices between braids.

The wire is uniformly cast to make possible even spooling and has uniform tensile strength to prevent breaking under the working tension.

These excellent wire qualities, plus careful packaging and prompt delivery, have resulted in Johnson becoming a prime supplier to the rubber industry for hose reinforcement wire.

The outstanding performance of Johnson wire in the rubber industry is typical of the experience in other industries where Johnson supplies aircraft cord wire, armature binding wire, wire for brushes, metal stitching, preformed staple wire, bobby pin wire, rope wire, oil tempered and MB hard drawn spring wire, and music spring wire in a wide variety of sizes and finishes.

If you use specialty wires, call one of the offices listed to right and explore the advantages of Johnson quality which combines strength with economy.



The Goodyear Tire & Rubber Company finds that Johnson meets their exacting requirements for tire bead wire which has high tensile strength, twisting strength, elongation and special surface finish. Here parallel tire bead wires uncoil evenly into a bead building machine.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
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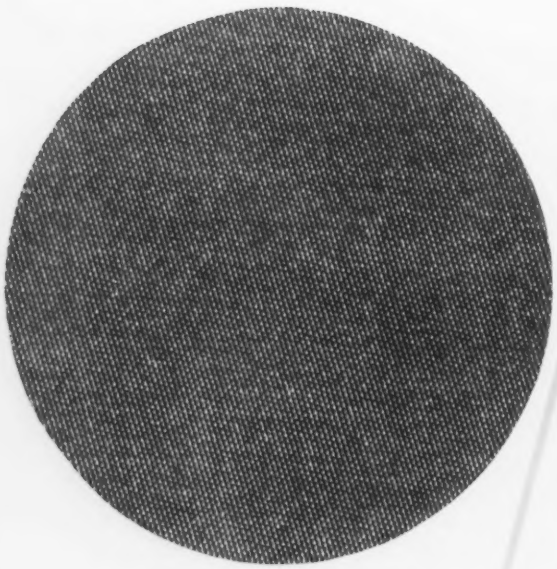
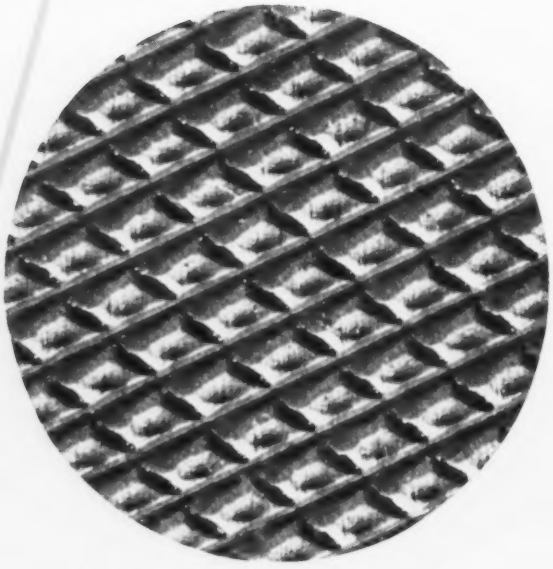
For the finest jobs...or the roughest jobs

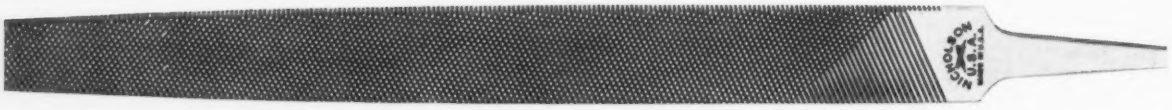


Tooth pattern of Nicholson-made Swiss Pattern Square Handle Needle file, Cut No. 6, magnified approximately five times.



Tooth pattern of Nicholson-made 18-inch Flat Bastard file magnified approximately five times.

There is a Nicholson and Black Diamond file for every purpose



Examine these close-ups carefully. They show several important points.

First, they indicate that Nicholson-made files are available in the widest spectrum of cuts. The cross section at left is magnified from our X.F. (*E*xtra *F*ine) Swiss Pattern Square Handle Needle file, Cut No. 6, the finest cut we make. Our X.F. files are primarily finishing tools, used by tool and die makers, delicate instrument parts finishers and jewelers. And there are *seven* separate degrees of fineness instead of the three usually found in conventional American pattern files.

The section at right is from our 18-inch Flat Bastard file. This rugged tool is used by machinists, ship and engine builders, repair men—any worker who wants to take off a lot of metal in a little time.

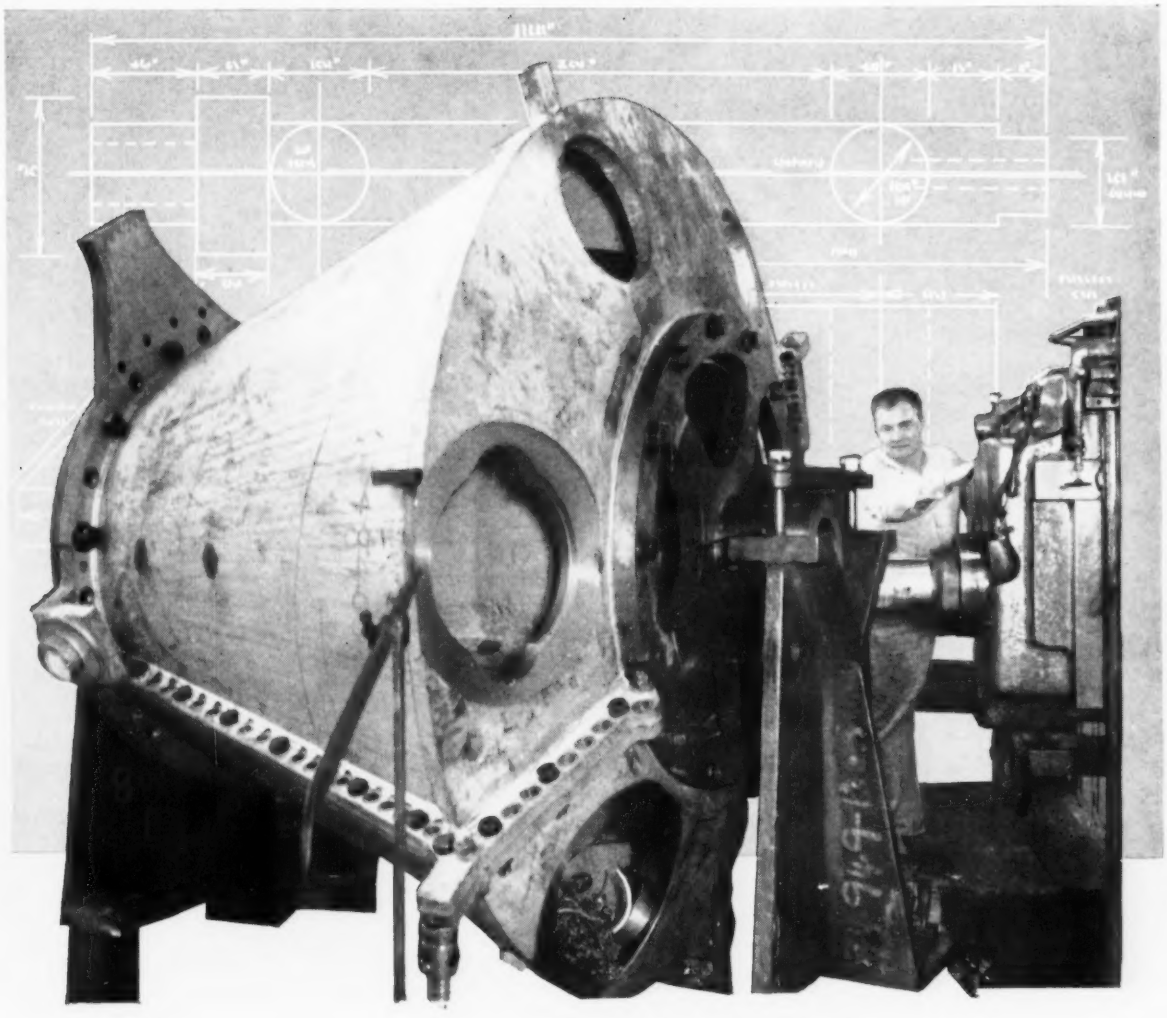
And notice the uniform tooth structure of both the fine Swiss Pattern cut and the big Flat Bastard. Fine Nicholson workmanship means top results for you. *Your dependable Industrial Distributor has the Nicholson or Black Diamond files you need.*

NICHOLSON U.S.A. **NICHOLSON FILE COMPANY, PROVIDENCE, RHODE ISLAND** BLACK DIAMOND U.S.A.

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

NICHOLSON FILE COMPANY

World's foremost manufacturer of A FILE FOR EVERY PURPOSE



"TAILORING" STEEL

Many machines and pieces of special equipment must be fitted to their individual jobs in modern industry with the precision that a custom tailor devotes to making a suit for an individual customer. Maintaining the skill, experience and modern equipment that can accomplish such "tailoring of steel" to special needs has always been a matter of policy and pride at Sun Ship.

Machining special cylinders—as shown above—or drilling condenser tube sheets . . . boring a cylinder liner . . . making small parts . . . planning and building the special-purpose machinery that modern industry needs—such are typical jobs in the historic and versatile Wetherill plant, the machinery building unit of Sun Ship's integrated plant.

Since Sun Ship's foundation, in 1916, the spirit of keeping pace with progress in the various fields we serve has helped build our reputation for precision and reliability. On any problem of machinery production that you may face, you are invited to consult with our Sales Engineering Department.

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SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE (SINCE 1916) CHESTER, PA.

How do you keep rocketing at 8000 mph?

Courtesy: Resistoflex Corp., Roseland, N. J.

For one thing, you feed your rocket fuel – savagely corrosive stuff, like white and red fuming nitric acid. You use a fuel line of Teflon hose, wrapped in stainless wire braid – with special stainless steel fittings to make it stay put.

The fittings are swaged on – and listen to a few of the 19 test beatings they get. In an impulse test, with fluid temperature at 400° F., an impact of 4500 psi is applied, and reduced to zero in one second. The cycle is repeated 35 times a minute – for 100,000 cycles.

Another test, at 450° F., submits the hose and fittings to vibration at 2000 cycles per minute through ¾" lateral movement. This grueling test is applied for 200 hours . . . is followed by a severe high-pressure test to assure a leak-proof seal. It's hard on the fittings . . . but a positive test of durability.

Frasse has provided trouble-free stainless steel for this vital fitting application since its inception – and often supplied it *in hours*, to meet production deadlines. So, if you want reliability in your product, and a reliable source of supply . . . rely on Frasse for *all* your stainless requirements. It's a habit you'll find profitable.

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This Recuperative Atmosphere Rotary Scale-Free Heating Furnace, manufactured by The Lithium Company, Newark, N. J., employs Norton segmented conduits — *engineered and prescribed* CRYSTOLON tongue and groove tiles. Other Norton refractory shapes in the furnace are ALUNDUM burner blocks — equally efficient in aiding Lithium's recognized advancement in many heating operations.

Lithium Company reports advantages of Norton refractories

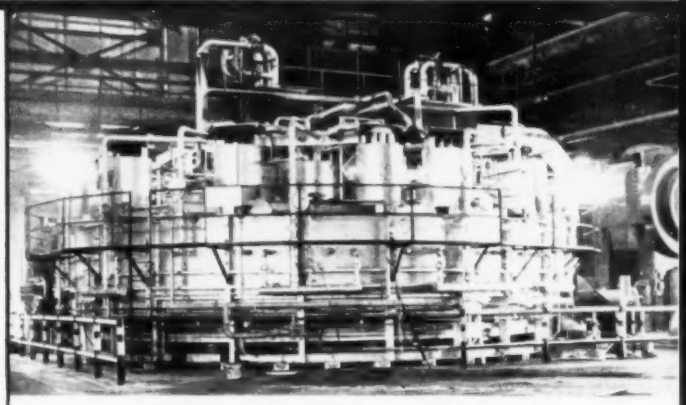
CRYSTOLON and ALUNDUM* shapes provide long, trouble-free service*

Selected by The Lithium Company for hot strength, high refractoriness, thermal conductivity and low thermal expansion, segmented conduits made of Norton CRYSTOLON tile give long, trouble-free service at temperatures up to 2900°F. ALUNDUM burner blocks have the same useful qualities, plus resistance to chemical attacks at temperatures up to 3450°F.

To Improve Your Own Furnace Performance

See your Norton Representative or *write for descriptive literature* to NORTON COMPANY, Refractories Division, 205 New Bond Street, Worcester 6, Mass.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries



One of a group of Recuperative Rotary Forging Furnaces installed by Lithium Company in a leading automotive plant for the production of *scale-free heated* billets to temperatures of 2400°F.

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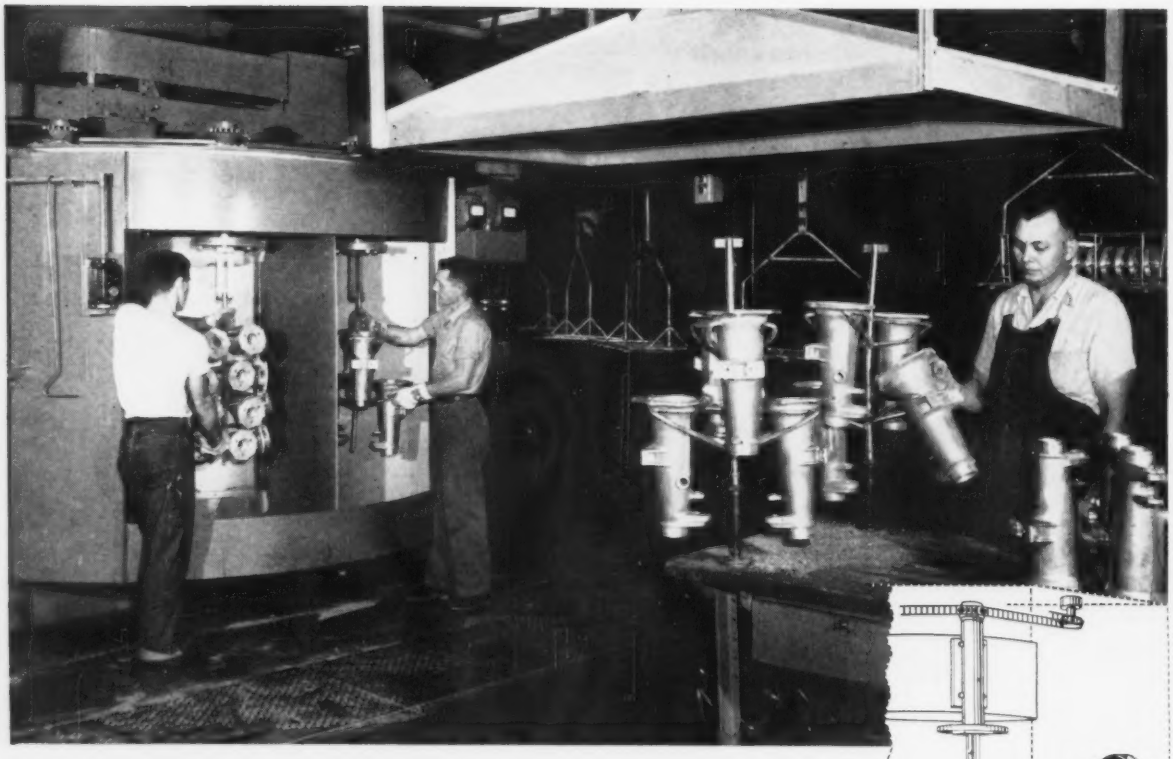

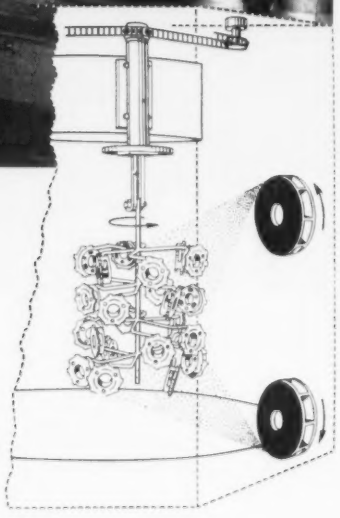

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deburrs Chrysler PowerFlite parts

more thoroughly at low cost!

Deburring and cleaning many of the parts in Chrysler PowerFlite automatic transmissions now is being done by Wheelabrator airless abrasive blasting in the Indianapolis plant of Chrysler Corporation. The reason: Wheelabrator deburring is more thorough since it does not miss surfaces as other methods sometimes do and it has helped reduce costs.

As illustrated in the above sketch, the non-metallic pellets thrown by the Wheelabrator units onto the parts as they are rotated in the blast stream assure greater uniformity in the deburring operation. Two of these Wheelabrator automatic deburring cabinets have been installed. One cleans and finishes cast iron transmission cases, the other deburrs machined cast iron, steel and die cast aluminum parts.

Deburring is only one of the many cost-saving applications of the airless Wheelabrator. Wheelabrator engineers worked closely with Chrysler to solve this finishing problem. This same assistance is available to you, without obligation, for your metal cleaning or finishing problems.

Write today for Catalog 74-C for complete information.

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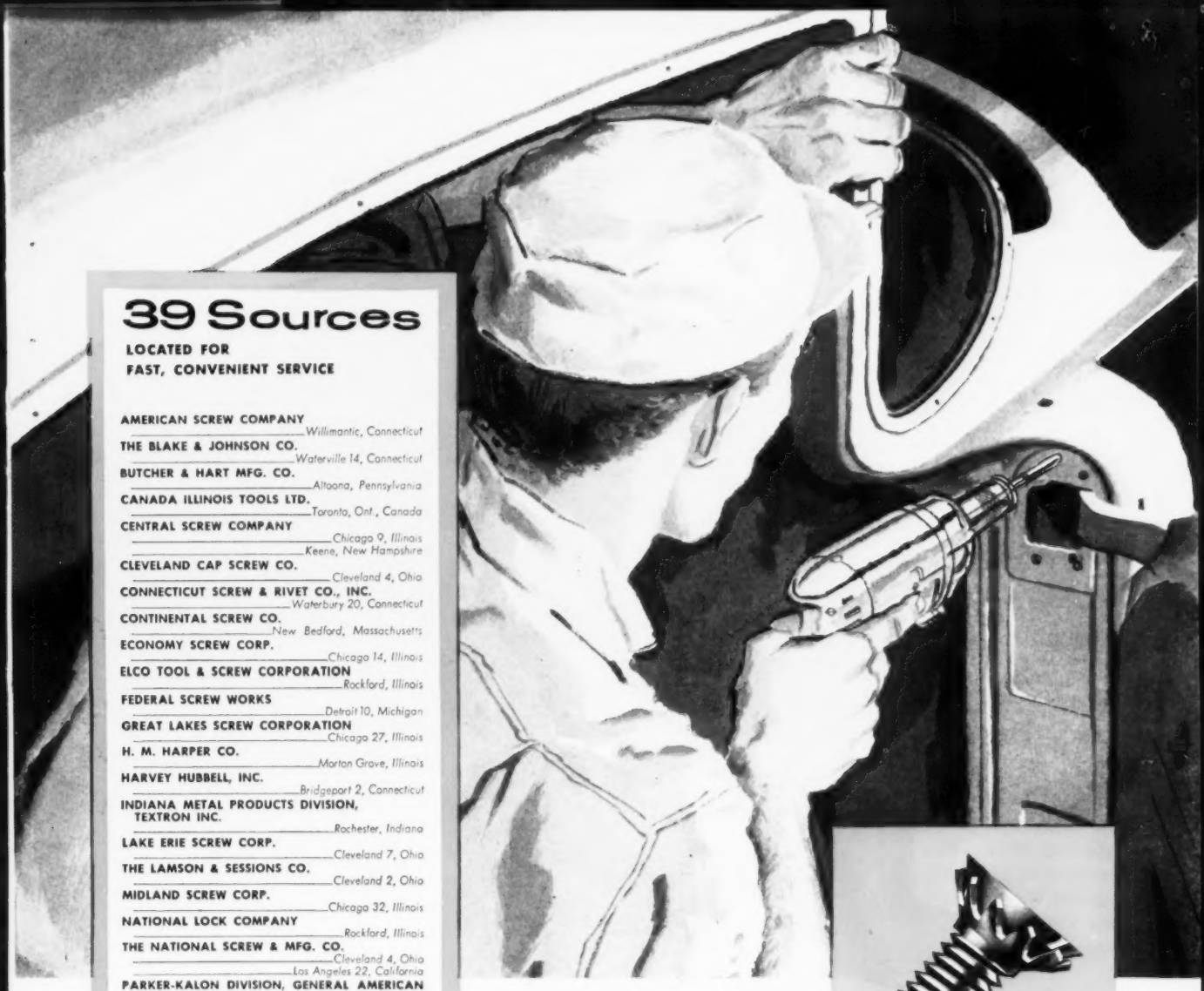
WORLD'S LARGEST MANUFACTURER OF AIRLESS BLAST CLEANING EQUIPMENT



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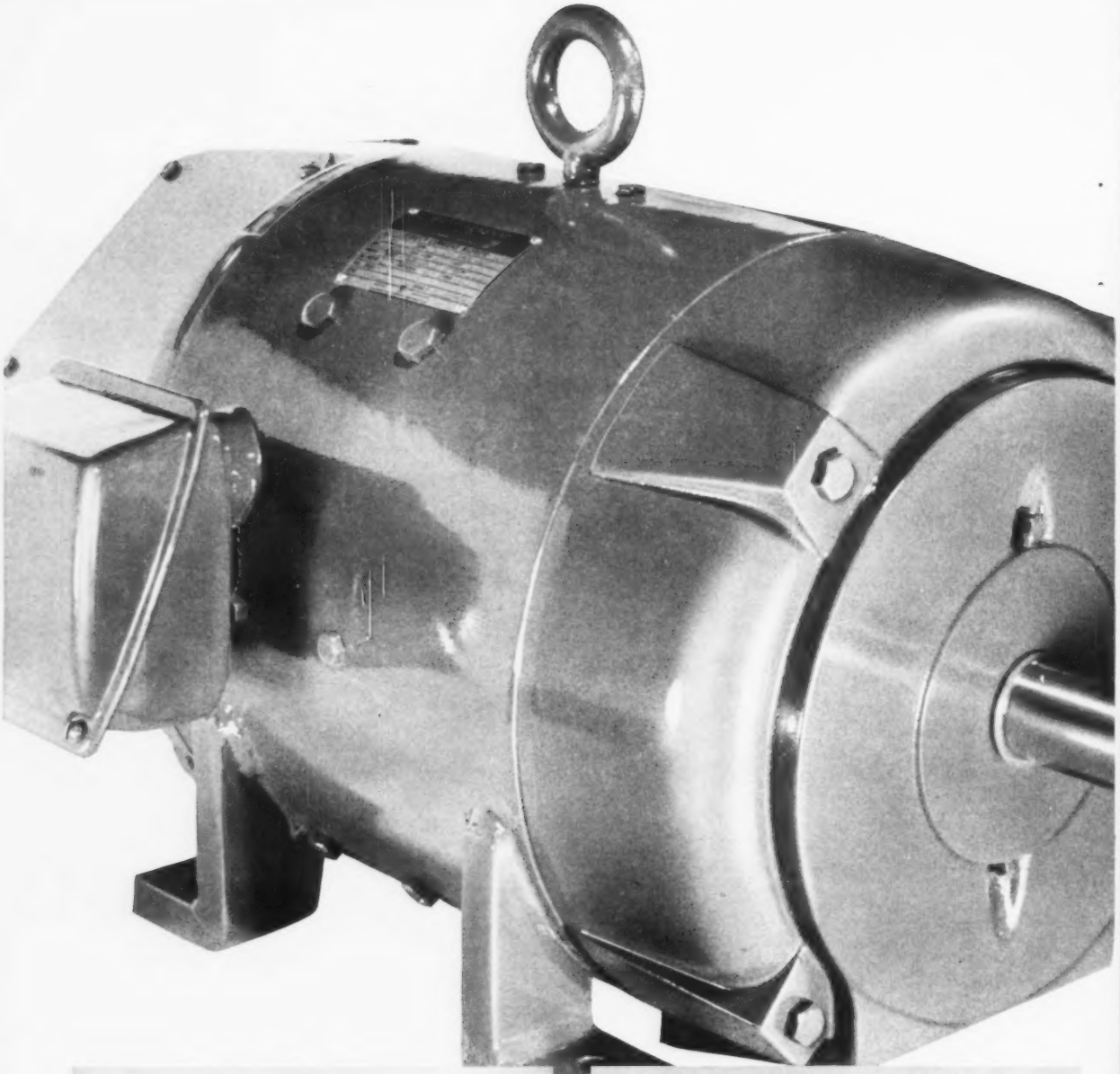
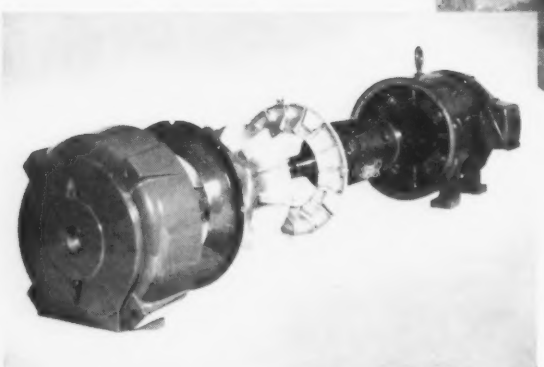
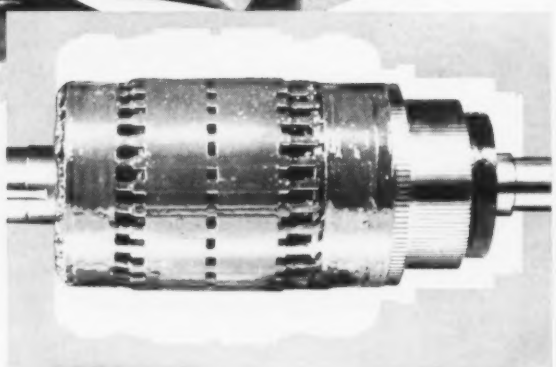




NEW CONTROLLED VENTILATION—pushes air through the motor from drive end to commutator end, opposite to the ordinary direction. Armature cooling is increased... harmful brush dust created at the commutator is blown out of the motor.



NEW LEVEL OF RESPONSE—Improved ventilation makes up to 55% lower armature inertia possible without sacrifice in capacity. Life-Line "H" gives the fastest accelerations and regulating speed changes for more and better production.

Westinghouse *Life-Line H* with silicone insulation

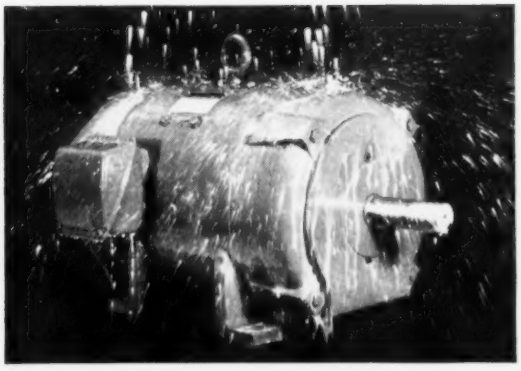
SHRUGS OFF EMERGENCY OVERLOADS . . . KEEPS STEEL PRODUCTION ROLLING

Insulation life is 10 times ordinary Class B, under any temperature conditions

With Silicone for at least 10 times longer insulation life . . . with a brand-new concept in ventilation for best cooling and cleaning . . . with greater housing protection than ever before . . . plus the highest level of response in any modern d-c machine. Westinghouse Life-Line® "H" motors and generators are tailor-made for the tough jobs and emergency conditions in steel mill operations.

Maintenance is easy, too, with the Life-Line "H". All points requiring occasional inspection and preventive maintenance have been made easily accessible.

The New Life-Line "H" offers many dividends in long-term, dependable operation and minimum maintenance. For all the facts, call your Westinghouse sales engineer. Or, write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa. Ask for B-7056. J-21991-A



NEW HOUSING DESIGN—provides maximum protection—eliminates need for splashproof enclosures in many cases. All access openings are sealed with covers . . . single ventilation opening in each bracket faces directly down.

YOU CAN BE SURE...IF IT'S

Westinghouse

HOW FLASH-BUTT RESISTANCE WELDING IS USED TO FABRICATE PRESSURE VESSELS

Severe test program proves Sciaky techniques of resistance welding provide the safe welds necessary for assembling butane gas containers

In a program undertaken to determine the metallurgical advantages of flash-butt welding for joining half shells of butane gas containers, Sciaky has established the suitability—and superiority—of the process for this application. The flash-butt process offers a 100% strength factor compared to 80% for flame or arc welds.

Job Description

Figure 1 shows the half shell and the assembled container. The metal is deep drawn low carbon steel. The

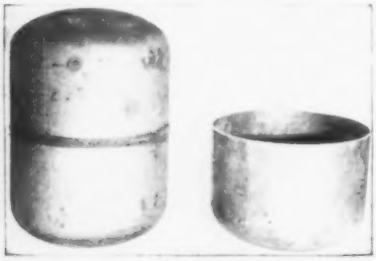


Fig. 1 At the right is a single half shell. At the left are the half shells joined by flash welding, flash not removed.

half shell has an I.D. of 11.6" and an O.D. of 11.8" or a cross section of 3.63 sq. in.

Special clamps were developed so that the clamping pressure could be applied to a maximum surface of the parts to be welded. End and side views of the clamp arrangement are shown in Figure 2.

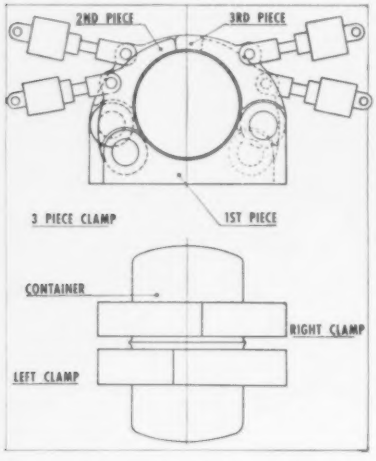


Fig. 2 Clamps for joining half shells.

The welder is a 300 KVA Sciaky Flash-Butt Welder with an upsetting force of 25,000 psi. Current is supplied to both the upper and lower clamping dies in order to assure uniform distribution throughout the diameter. One platen is fixed and the other movable. The flashing system is pneumatically operated and flashing time controlled by an adjustable metering valve.

A wedge cam provides the proper platen acceleration for flashing. A tap switch affords sixteen steps of heat regulation. Copper alloy clamping dies are used as locators and also serve as back-ups for the piece parts during the upsetting.

Test Results

The safety of the flash-butt welds was extensively tested under hydraulic pressure. Two such containers are shown in Figures 3 and 4 and for comparative purposes a fusion welded container in Figure 5.

Extensive metallurgical tests were also conducted from which the following conclusions were drawn:

1. Flash-butt welding makes it possible to obtain a strictly autogenous weld. This is true because the weld is made without the addition of extraneous material, and because the upsetting action displaces the melted base metal and impurities at the weld joint.
2. The flash-butt process makes it possible to obtain a joint having the same consistency on the inside and on the outside of the containers. See the macrographs, Figures 6 and 7.

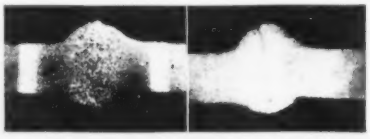


Fig. 6 Macrographs of flash welds before (left) and after annealing. Note consistency on both inside and outside.

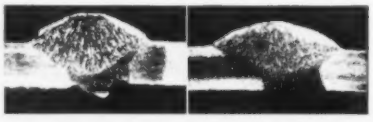


Fig. 7 Macrographs of arc welds before (left) and after annealing. Note irregularities on inside due to lack of penetration of extraneous material.

Complete Report Available

A complete, detailed report with extensive illustrations and the results of additional tests is available without charge. Please write on your company letterhead asking for the *"Engineering Report on Resistance Welding of Butane Gas Containers."* There is no obligation.

Fig. 3 Flash welded and annealed container which burst at 1349 psi. Weld elongation was 29.6%.

Fig. 4 Flash welded and annealed container which burst at 1278 psi. Weld elongation was 24.3%.

Fig. 5 Fusion welded and annealed container which burst at 994 psi. Weld elongation 11.6%.

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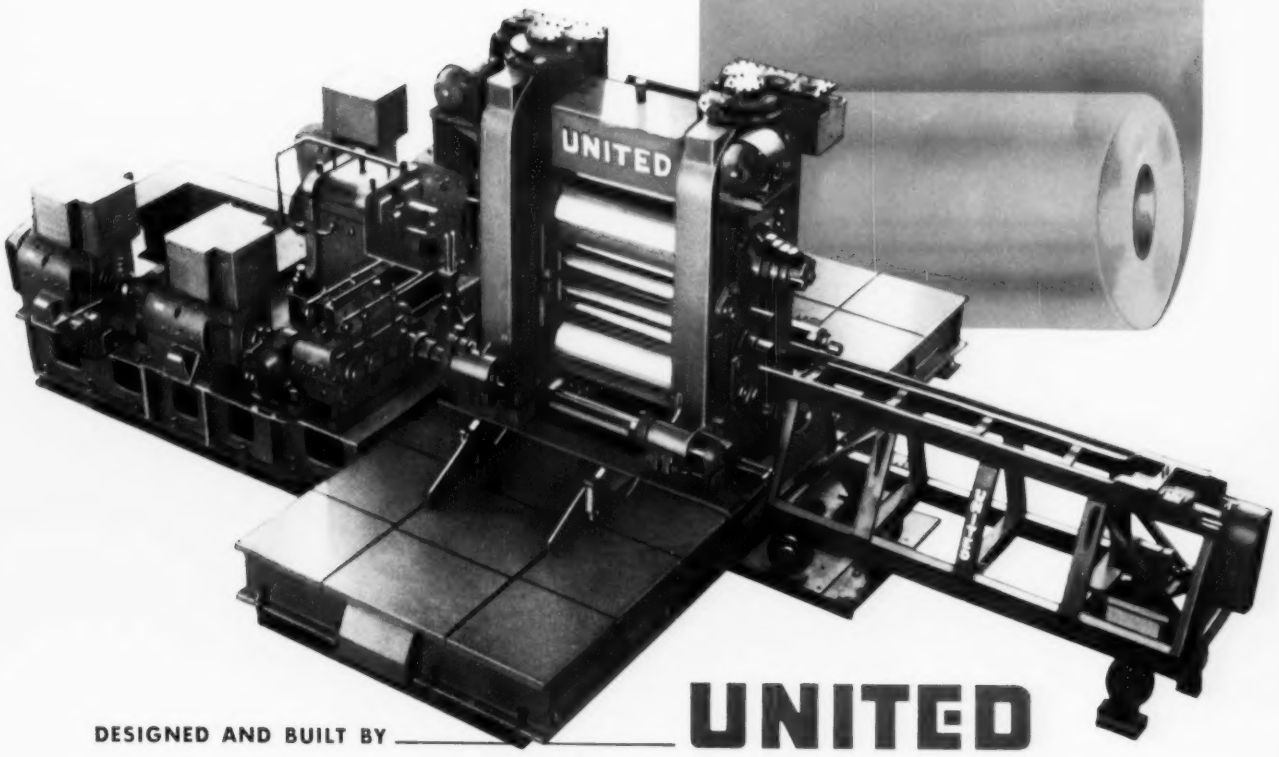

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P.M. of another good day

"Good" because this Inland Steel mill representative has just spent the day with a customer. Tired though he is, he's had the satisfaction of helping another steel user solve a knotty problem. That's his job—his and other Inland men like him who bring expert metallurgical knowledge to every assignment. They can help you select proper steels, establish specifications and may even suggest techniques to speed production, lower manufacturing costs. It's this kind of service that makes it good business to call on Inland for your steel needs.

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Deadline Spurs Buying

Nobody is putting it just this way, but a mild flurry of new sheet orders at the mill level can be traced to purchasing agents trying to beat the price increase expected in July. While some of the buying is due to over-exhaustion of sheet inventories, at least a portion is laid to the price scare.

Bolts Beat Rivets

High-strength bolts are gaining favor over rivets in structural joint applications that involve load variations and high flexing. Recent tests confirm that the bolts — teamed with heavy washers of good quality—produce a joint more resistant to fatigue tears between bolt holes. Overhead crane members and ore bridges are where the new info was developed.

Cheaper Titanium?

Scientists have come up with a new way to make titanium tetrachloride, vital ingredient in manufacture of titanium metal. The new method uses low-grade ilmenite ore to produce higher purity—but less costly—titanium tetrachloride at candle-flame temperatures. About four pounds of the compound are needed to make one pound of metal; current use of more expensive rutile ore and high-temperature processing are major factors in the cost of titanium today.

Coming Out Early

Watch for General Motors to introduce 1958 models earlier than usual. This doesn't mean the new cars will be on the street by August, as has been reported. It's admitted, though, that competition has forced GM to launch a crash program for '58. Best estimates now put new-model introduction about 30 days ahead of normal but no sooner. Reason given: GM wants to take full advantage of fourth-quarter sales.

Small Arms Revamped

While ordnance fanfare is directed at guided missiles and atomic bombs, the Army is quietly improving its small arms too. A new lightweight 30 gal. machine gun, the M-60, is expected to go into production soon after the new fiscal year begins July 1. And in 1958 the M-14, a new 30 cal. rifle, will begin replacing the M-1, the BAR, and the carbine.

Tighter Tool Policy

In view of current Congressional economy sentiment, Air Force officials intend to stick closely to a "tight" machine tool procurement policy. New tools to modernize production lines will be purchased only when a "specific manufacturing cost saving can be demonstrated by a contractor." So there isn't likely to be any subsidy feature in the Air Force tool modernization program.

Electrons Make Bearings

A patent has just been granted for a method of making tiny ball bearings by means of an electron stream. The beam of electrons is focused to increase current density at the point of impingement to melt or split objects into small particles. It's done in a vacuum. The process is said to produce hard ball bearings from aluminum oxide and other materials deemed suitable for anti-friction use.

Coded Cards Plot Sales

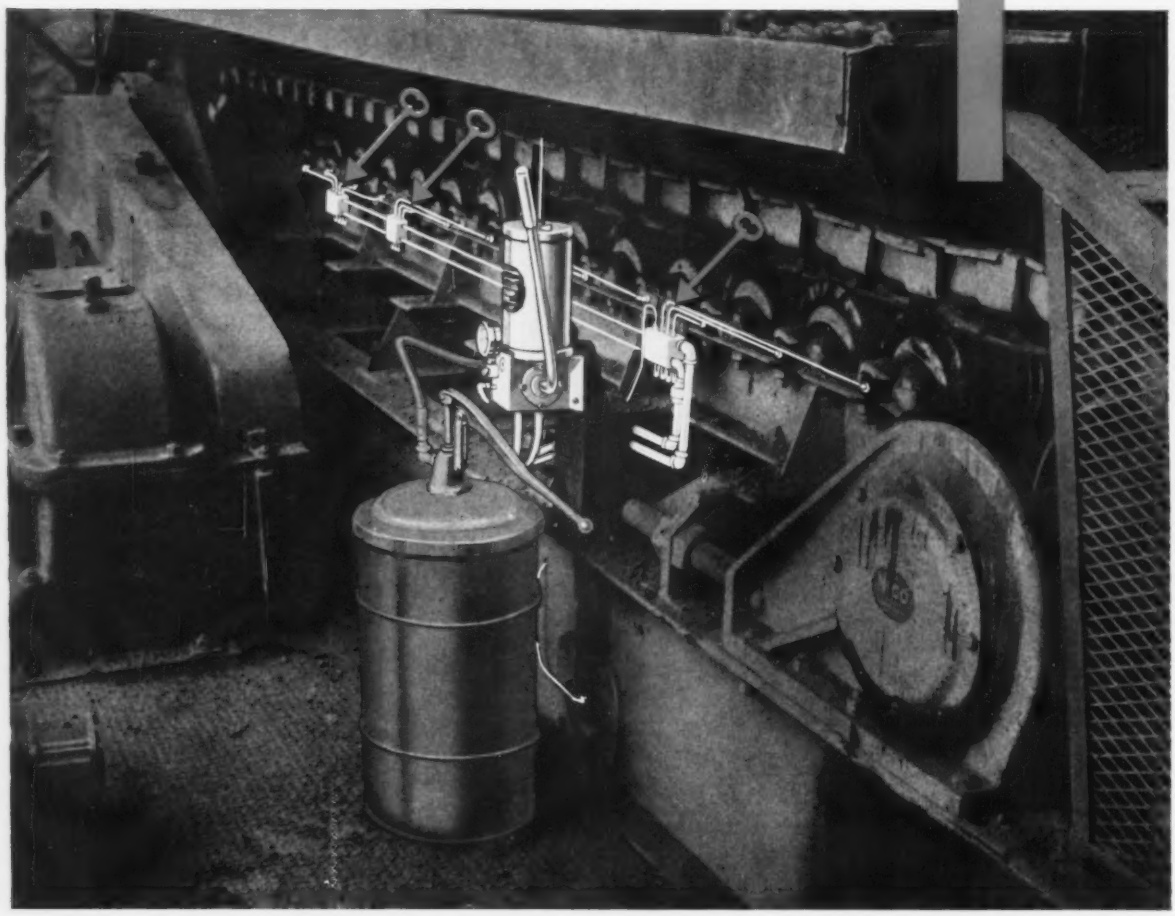
When some of the big jobbing foundries started using coded cards for scheduling production, it was agreed that use of the same technique for sales analysis was only a matter of time. The time is now. One foundry is already doing it, and another will put its production-programming equipment to work on sales analysis within 60 days.

To Work In Three Planes

A new multi-head drilling machine for making holes in airplane wing skins will be fully tape-controlled to drill in three planes. After the wing is positioned in the jig, one or more drill heads will move in sequence from one point to the next and drill out holes at different angles. The machine is expected to speed wing-making considerably, and the tape control will insure accuracy.

Farval keeps pan feeders running smoothly in dust and grime of ore processing plant

FARVAL—
Studies in Centralized Lubrication
No. 201



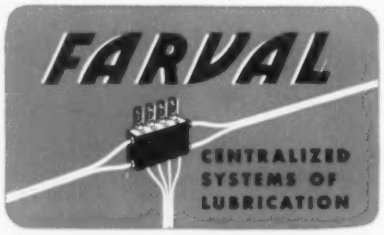
KEYS TO ADEQUATE LUBRICATION—
Wherever you see the signs of Farval—the familiar central pumping station, dual lubricant lines and valve manifolds—you know a machine is being properly lubricated. Farval-lubricated heavy-duty manganese feeder, at work in Hanna's new Hunner plant at Coleraine, Minn., is made by National Iron Co., Duluth.

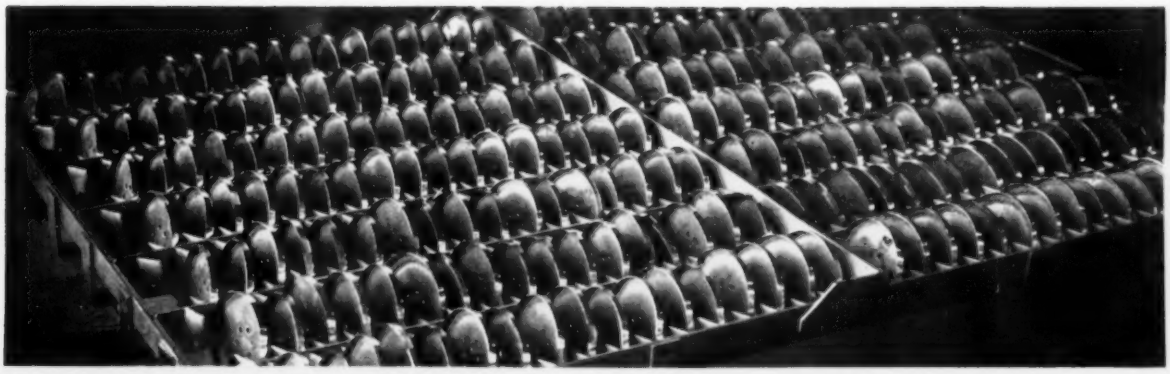
No matter how dusty the air and thick the grime, the Farval-protected bearings on this feeder will run bright, unworn and clean for years to come. Serving 37 points of lubrication, this manually operated system is one of five installed recently on pan feeders for ore processing plants in the Iron Range of Minnesota.

Farval centralized lubrication is the ideal method—not only of protecting bearings, but of insuring continuous operation of vital industrial equipment. With Farval on the job, there's no shutdown for lubrication, no work stoppage for bearing repair or replacement. Frequently, this time-saving feature alone can soon pay for a Farval installation in the value of increased machine output. And in addition there are worthwhile savings in labor and lubricant.

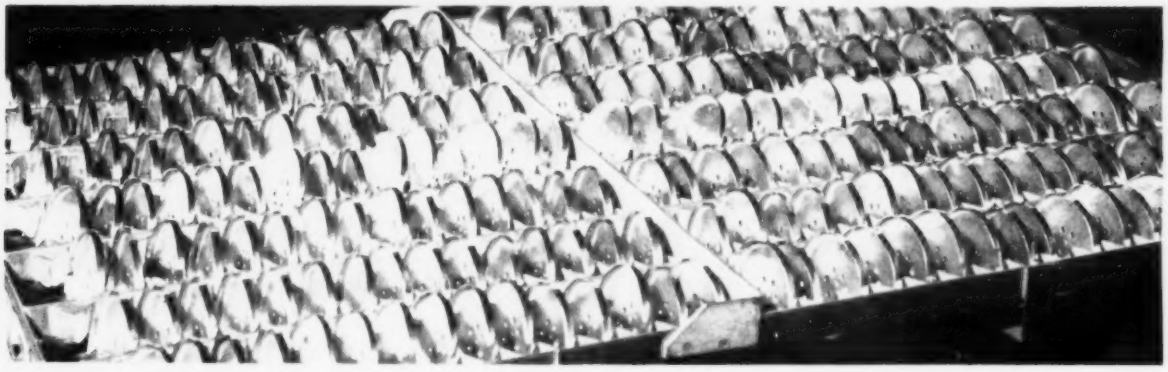
There are thousands of Farval automatic and manually operated systems in use, serving millions of industrial bearings. Millions more *need* Farval. If you have a machine that could benefit from better lubrication, write for our Bulletin 26-S. The Farval Corporation, 3282 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.





THE EVIDENCE: Trays of parts before and after cleaning by ultrasonics. General Ultrasonics photo.



Versatile Ultrasonics Widens Its Metalworking Range

Although 500 firms are already using ultrasonics equipment, it's only the beginning for this versatile development.

Long list of applications shows why field is expected to grow tenfold in next ten years.—By G. G. Carr.

▪ A new arrival to industry 15 years ago, ultrasonics is proving one of the most versatile items in metalworking's tool kit. And enthusiasts believe industry has only started to find jobs for it.

Some market figures are revealing. The 20-odd members of Ultrasonic Manufacturing Assn. alone turn out equipment estimated between $15-$25 million in sales annually, excluding important military-type sonar equipment. Many in the field talk seriously about a tenfold sales increase in the next 10 years.

More Installations—In the major field of ultrasonic cleaning, an estimated 500 firms have already made installations totaling about $3 million. Balance of the market for such cleaning units is figured at about $2 billion at present.

A 1953 IRON AGE survey of all types of nondestructive testing methods used in metalworking indicated that over one-fourth of all companies wanting additional testing equipment specified ultrasonic machines. And 10 pct of all respondents indicated they were already using ultrasonic inspection, either alone or with other methods. Today, ultrasonic testing has become commonplace.

Wide Applications — Versatility of applications is a big selling point for ultrasonic equipment makers.

WHO MAKES ULTRASONICS EQUIPMENT

Acoustica Associates, Inc.
Cleaning, instruments, flotation, welding and soldering, heat transfer, boiler scale inhibition, degassing, emulsification and liquid processing, barnacle inhibition, drilling and grinding.

Aeroprojects, Inc.
Soldering and welding, drilling and grinding.

Blackstone Corp.
Cleaning.

Bodine Soundrive Co.
Oil well drilling.

Branson Ultrasonic Corp.
Cleaning, instruments, research degassing.

Cavitron Equipment Corp.
Drilling and grinding.

Curtiss-Wright Corp.
Cleaning, instruments, soldering and welding, drilling and grinding.

Detrex Chemical Industries
Cleaning.

General Ultrasonics Co.
Cleaning, plating, etching, flotation, impregnation, heat transfer, boiler scale inhibition, research, degassing, emulsification and liquid processing, pickling, quenching.

Gulton Industries
Cleaning, instruments, soldering and welding, research, drilling and grinding.

Walter Kidde & Co.
Instruments.

Magnaflux Corp.
Instruments.

Photocon Research Products
Instruments.

Raytheon Manufacturing Co.
Drilling and grinding.

Sheffield Div., Bendix Aviation
Drilling and grinding.

Sperry Products, Inc.
Instruments.

Equipment is now being used for these major applications:

Cleaning and degreasing; plating; etching; inspection and measurement; impregnation; soldering and welding; boiler scale inhibition; degassing; emulsification and liquid processing; barnacle inhibition; pickling; drilling and grinding; oil well drilling.

In addition, promising research is now going foward on applications for: Ore flotation; particle precipitation; heat transfer; heat treating; quenching. Many in the industry feel that its use as a research tool should be given a separate category.

No Extravagant Claims—Equipment makers are careful about claims today. In the first flush of enthusiasm, some in the industry publicly envisioned applications which never got out of the laboratory. The ultrasonics clothes washer now seems to be a good example. (But ultrasonic dishwashers may have a bright future.)

General motors has had an ultrasonic quenching installation at Saginaw for some time, but the industry feels more data are needed before this can be called a fully proven application. Other uses look beautiful in the lab, prove to need impracticably large amounts of energy in industrial use.

Where It Works—Cleaning and degreasing is the major production use to date. Scovill Manufacturing Co., Waterbury, Conn., has just revealed it has had a General Ultrasonics Co. cleaning line in operation for over 6 months. Rouge buffing compound is removed from brass parts for women's compacts before plating at a rate of over 250 parts every 20 seconds.

General Ultrasonics has just finished installing a new set-up at the Keeney Co., Newington, Conn., maker of plumbing supplies. Here the ultrasonic unit replaces a hand color-buffing operation on brass plumbing parts before nickel plating. Heavy deposits of buffing compound are removed in seconds in an ultrasonically agitated tank incorporated into an automatic plating machine. Stuart Holden, production manager of Keeney, reports he is more than satisfied with the new unit.

Problems Solved—Gray Research & Development Co., Manchester, Conn., had a serious cleaning problem with precision potentiometers. Rejects due to contact resistance failures in completed assemblies were high. The potentiometer was difficult to clean, especially down between turns where small particles of insulation material and other dirt would tend to pack, ultimately cause contact resistance.

After installing an ultrasonic cleaning unit, rejections for contact resistance from improper cleaning dropped to virtually zero. Gray feels that the new unit has well paid for itself in the first few months of operation.

Areas to Develop—There are, of course, pros and cons to ultrasonic cleaning. In many cases, probably the majority, conventional cleaning methods are perfectly satisfactory. Ultrasonic machines are not cheap. But for intricately shaped parts, with hard to reach cavities, or to replace hand operations, ultrasonic cleaning can make a real contribution.

Pickling looms as a major use. Ultrasonic agitation of pickle liquor can speed pickling by substantial amounts, produce a far cleaner surface. And it can often permit use of a very mild reagent. Royal-McBee uses 5 pct citric acid as pickle liquor in an ultrasonic installation. Other users get good results with oxalic or tartaric acid.

Plating Applications — Ultrasonics is proving out in many plating uses. According to Stanley Rich, president, General Ultrasonics, ultrasonics can aid in producing extremely uniform and well bonded coatings at up to 30 times normal speeds. Anode polarization is eliminated, and edge build-up minimized, often eliminated. Even rusty, dirty and greasy parts can be plated in a single operation with excellent results.

This, of course, is not recom-

mended as normal procedure since the plating bath can become contaminated. But it can be important in reducing rejects when occasional pieces are not completly pickled and cleaned before plating. Speeds of ultrasonic plating are impressive. Mr. Rich reports that some companies are hard chrome plating at current densities up to 15 amp per sq in.

Speeds Anodizing — Ultrasonics is finding other uses in metal finishing. It is now speeding and improving anodizing, and is proving out as a means of coloring chromate conversion coatings of zinc. This may well prove a boon to diecasters, who were recently berated for failing to move fast enough.

Drilling and grinding applications are winning a firm place for ultrasonics in metalworking. Such jobs as cutting 0.005-in. slots 5/8 in. long in stainless steel in 10 minutes have become routine. Other typical jobs for ultrasonics include sinking a complete blanking die or intricate shape in hardened tool steel to a tolerance of 0.0002 in., simultaneously cutting several hundred transistor crystals at one time in less than a minute and simultaneously cutting more than a dozen accurately spaced holes in ceramic spacers in a few seconds.

More to Come — All these and many of the present uses of ultrasonics are important. But the most important things are still to come. Applications of ultrasonic energy to steel during heat treatment have resulted in a refinement of grain structure and an appreciable increase of hardness. (THE IRON AGE, Dec. 8, 1955.) Similarly, ultrasonic agitation of quench oil provides hardness ratings harder than can be attained by mechanical agitation, and permits use of cheaper oils. (THE IRON AGE, Aug. 30, 1956.) General Ultrasonics is now developing equipment to speed etch-milling by as much as 5000 pct.

Looking Ahead—In process industries, the future is equally bright. Continuous emulsification is now a reality. General Ultrasonics has issued a preliminary bulletin citing these results in extraction, penetration and dissolving: Extraction of vanilla from vanilla bean cut from 6 weeks to 6 hours; tanning of heavy steer hide reduced from 3 weeks to 1 hour; dissolving of rubber in organic solvent from 24 hours to 20 minutes.

And if your next bottle of beer pours better, it may well be because it has been ultrasonically defoamed before capping. Like atomic energy, to which it is often compared, the most important uses of ultrasonics may not yet have been discovered.

How to Use Ultrasonic Cleaning

Typical Examples

Soil To Be Removed	Cleaning Medium	Temperature	Comments
Rouge	Water and detergent ½ ounce per gal. plus 5 pct ammonia	130° F	No presoak necessary. Removal 15 to 120 sec. depending on thickness.
Buffing, lapping, grinding compounds	Water and alkaline cleaner, 2 to 4 ounces per gal.	140° F	30 to 60 sec. presoak desirable. 30 to 120 sec. removal.
Magnaflux paste, cerium oxide, dust, radioactive dirt, loose chips.	Water and detergent ½ ounce per gal.	120 to 140° F	Complete removal 15 to 60 sec.
Soft solder flux	Isopropyl alcohol 50 to 100 pct.	120° F	30 to 180 sec. complete removal.
Hard solder fluxes	Mild acid; 5 pct citric or 3 pct muriatic plus detergent ½ ounce per gal.	120° F	15 to 30 sec. removal.
Oil, grease, shop dirt.	Organic solvents trichlorethylene, Varsol, Stanisol.	140° F	2 to 30 sec. removal no presoak.
Blood (surgical instruments)	Water and detergent ½ ounce per gal.	Room temp.	10 to 30 sec. complete removal.
Investment materials	Aqueous solution of polyphosphates	140° F	Under 1 min.
Casting sand	Water and alkaline cleaner, 2 to 4 ounces per gal.	140° F	1 to 2 min.

Source: The General Ultrasonics Co.

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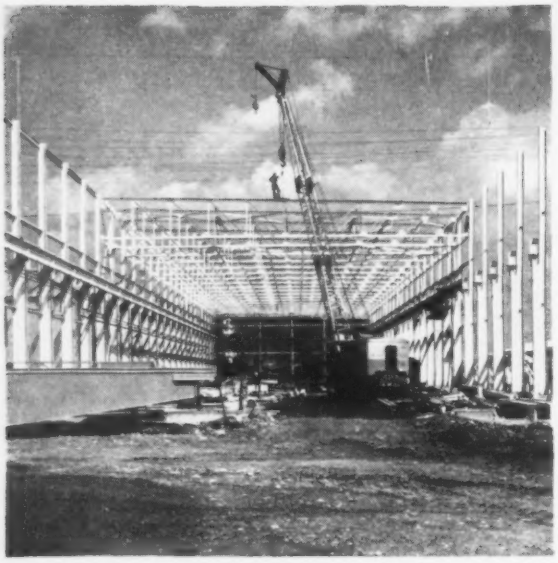
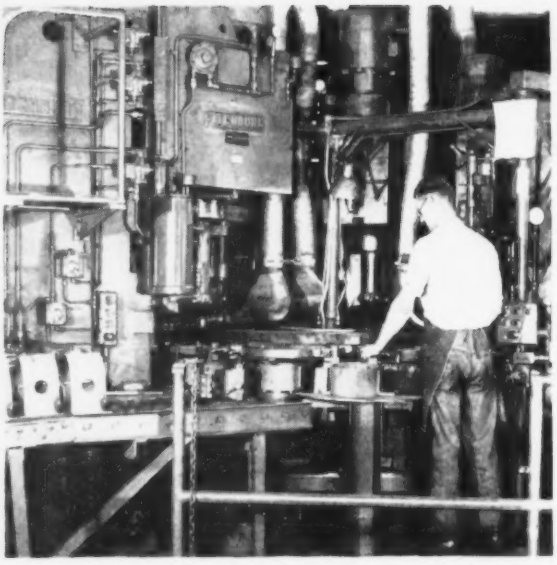
Machinery for Poland

Poland will get $30 million worth of U. S. mining and other machinery from this country as a result of a new agreement.

Total of $48.9 million in American agricultural products and machinery, is the first aid to go to a Communist nation. It is being offered largely as a result of last fall's satellite revolts in Eastern Europe.

Could Get More—The machinery will be purchased with a loan to be made by the U.S.-Financed Export Import Bank. As a result of the agreement—which may give the Poles another $40 million in farm products if Congress passes necessary legislation — the Poles have agreed to begin negotiations on settling of American property claims growing out of nationalization measures in that country.





DECISIONS: Whether or not to sub-contract often involves decisions of major importance. Making all the parts yourself could mean a new expansion program or buying and installing expensive equipment.

Should You Make It or Buy It?

Shifting tides of business put make-or-buy questions on agenda of most companies.

In comparing costs, figure all variable overhead to make it; and all expenses in buying it.

Systems developed to handle comparisons in complicated situations.—By G. J. McManus.

■ To make, or to buy? This is the burning question for much of industry today.

Air frame makers have been told their military business will be cut in half by 1960. They may have 50 million sq ft of idle space by that time. Should they use this space for the 30 pct of their work that is now being sub-contracted?

Automakers are still buying 50 to 70 pct of their parts. Should they do more outside buying or less?

Capital goods suppliers find their shops loaded and deliveries extended. Should they do more subcontracting? Should they expand capacity?

Make-or-Buy Group—These are some of the broad situations involving make-or-buy decisions. All companies face similar decisions in their daily operations.

General Electric, which deals with 35,000 vendors and 17,000 sub-contractors, is in the process of setting up a company-wide make-or-buy policy. Each plant will have a permanent group from purchasing, finance and production depts. to make continuing make-or-buy studies of all parts having annual volumes of $50,000. The company has indicated it will bear down hard on the subject in deciding on future expansion.

Westinghouse has a similar committee-type procedure for make-or-buy problems. Representatives of purchasing, production and other departments put their heads together to come up with a recommendation.

Solve Overlap—This system aims at getting around the difficulty that make-or-buy decisions overlap production and purchasing departments.

In making a comparison, the basic criteria are costs and savings.

Figuring cost of a purchased part should include all charges that will be entailed in its use—inspection, receiving, purchasing expense, transportation, storage. One production veteran offers this rough working rule: A purchased part must cost at least 25 pct less, delivered, than company-made to represent any saving.

Directly Affected Overhead — In establishing the cost of the homemade part, the items considered will vary. Methods Engineering Council, Pittsburgh, says only cost items which will be affected by the decision should be considered. This method knocks out rent, light and fixed charges if they will not be increased, and includes direct labor, variable overhead, material cost, special instruction, added supervision and other variables. Figures should be assembled for a realistic volume, and for significant period of time. If conditions cannot be predicted with any degree of as-

surance, provision should be made for regular reviews of costs.

If to make a part will call for new equipment, depreciation charges and investment return must be considered. Westinghouse figures 20 pct as the minimum return required of a proposed capital investment. A company must also consider alternate uses of money.

Combination—Very often make-or-buy decisions involve a number of parts and a number of machines. The problem is then what combination of making or buying will give the greatest saving.

Linear Programming, and other systems, have been devised to juggle cost elements into applicable order. Similar techniques can be applied to leveling out seasonal variations in production.

Expand Uneconomical—Another type of variation is the feast-or-famine selling that marks the capital goods industry. Sales of United Engineering and Foundry Co. jumped from about $40 million in 1947 to over $85 million in 1952. They dipped under $50 million in 1955, bounced back over $60 million last year.

United president G. C. Beard pointed to these ups and downs in defending his company's use of subcontractors for 10 pct of its work. He said it would be uneconomical to extend capacity to meet peak demands.

For one producer of hand power tools, the only answer to seasonal variation is high production capacity. The company feels sub-contracting is not practical because its market demands fast delivery from broad stocks.

Outweigh Costs — There are other cases where costs will be outweighed by other factors. Parts calling for highly specialized manufacture are bought or made, regardless of cost, where the experience in the field lies.

Companies will place work with suppliers during slack periods merely to keep alive the sub-contractor's engineering familiarity with its work.

New Gage Flashes Steel Thickness

The element of human error is reduced one more notch at Fairless Works.

Electro-mechanical device permits instant checking of steel strip dimensions at any location.

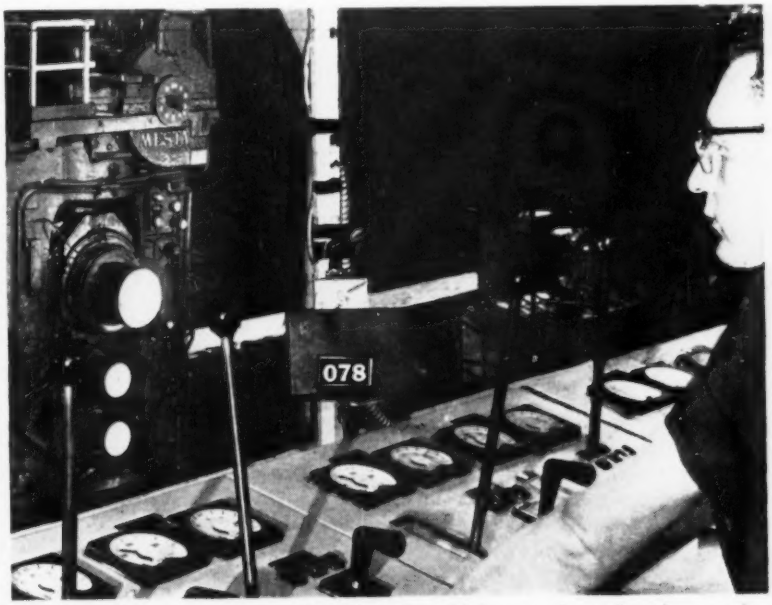
▪ Checking the thickness of steel strip as it runs through a hot-rolling mill can be done at a glance at U. S. Steel's Fairless Works.

A new electro-mechanical device developed by the corporation's Applied Research Laboratory, translates X-ray measurements into 1-in high numerals that are flashed on luminous plates. The measurements, in three decimal places, are clearly readable at 30 ft. The data can also be presented instantaneously in printed form.

Does the Adding — Fairless Works management installed the device on its 80-in strip mill, with successful results. "The new signal converter makes for faster and more accurate reading of finished-strip thickness and helps coordinate the operation of the various controls on hot-strip rolling mills," the company reports.

"Read out" stations are located in the control pulpit, the finisher's pulpit, and in the coiling pits. Another is to be added at the observer's desk. Previously, the operator had to make a mental calculation summing two dial readings in order to read the actual gage being rolled.

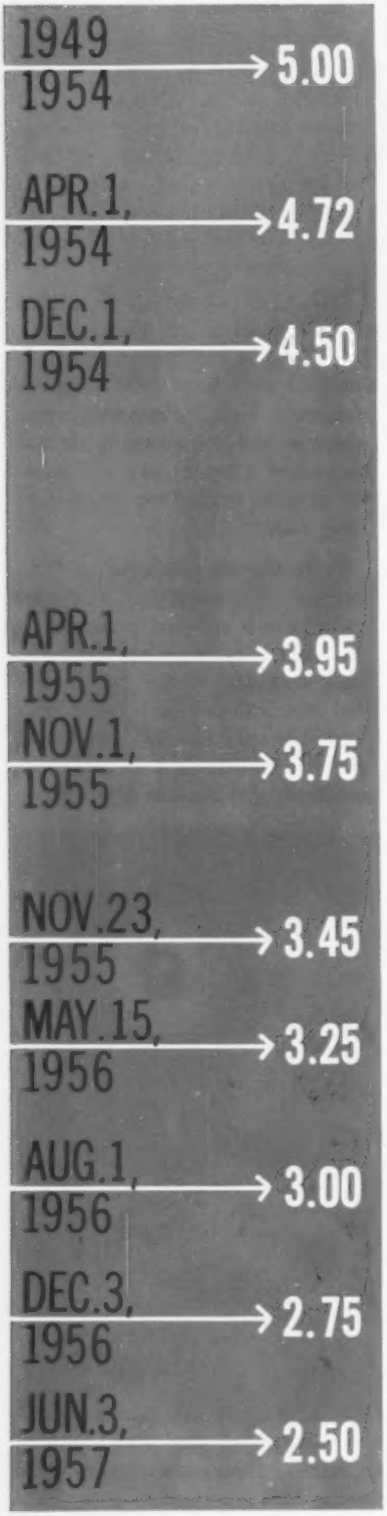
Cycle Control Included — The problem of simplifying the two readings into a digital presentation was solved by first converting the shaft positions of the two meters into electrical voltages. These voltages were then summed, applied to an analogical-to-digital converter, and finally displayed in digital form.



READ-OUT: There's no mistaking the thickness of steel strip running through this mill at U. S. Steel's Fairless Works. Illuminated figures show it to be .078 in. New device was developed in USS laboratories.

Will Lower Prices Help Titanium?

Price History Of Titanium Sponge Dollars per Lb



In less than 10 years, the titanium industry's growth has been spectacular.

But cutbacks in defense spending are its first serious blow. Here's how producers plan to block it.—By K. W. Bennett.

▪ Titanium, the silvery wonder metal, faces the toughest crisis in its brief but brilliant career. Initial effects of the slowdown in Air Force procurement already are evident with cutbacks in rolling mill schedules.

Sponge producers still crack along at capacity, but at least two have completed plans for production slowdowns beginning in July. And at least two major expansion plans have been temporarily shelved.

Titanium makers realize that they can't rely on defense applications forever. The industry is at work on many fronts to develop new applications for the general market and to bring the price down to the point where it can be considered in competition with other materials.

Armour Unveils — In this direction, Armour Research Foundation guardedly pulled the wraps from its process for titanium tetrachloride production, the raw material from which the metal is produced. The Armour process, being patented by the Foundation for license, reduces low cost ilmenite ore (costing about $17-20 per ton as compared with more easily worked rutile costing about $150 per ton), eliminates costly iron which soaks up chlorine in most processes where ilmenite ore is used.

The Armour process separates titanium tetrachloride from a potassium-titanium chloride salt with no more heat required than that produced in the flame of a match. Costly heating is reduced, and with it, resulting high corrosion rates in vessels, valves, and tubing.

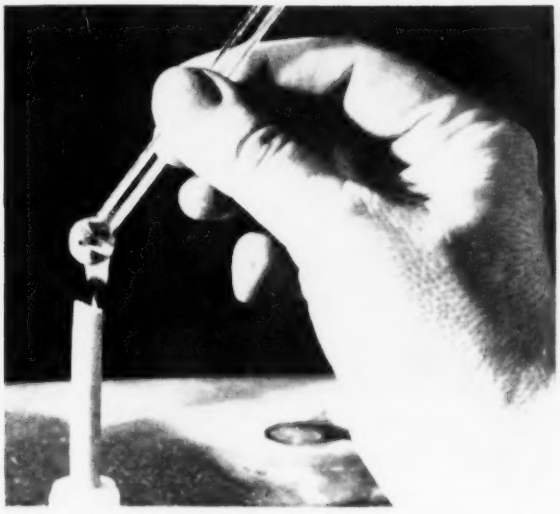
Prices Lower—A plant to produce 15,000 tons of titanium tetrachloride per year would cost about $2.2 million. It would use 18,700 tons of ilmenite; 22,400 tons of sulphuric acid; and 16,500 tons of hydrochloric acid gas. While Armour did not confirm it, at least two sponge producers are interested. In the long run, it could mean substantial future cuts in titanium prices.

Some cuts are already here. Titanium producers recently announced a 10 pct reduction in titanium products. Du Pont has announced a 50¢ per lb reduction in sponge prices.

Reason for Worry—Sponge producers are at capacity at the moment. Capacity last year was over 13,000 tons and production hit the same level. Of that output, 10,000 tons was for current use and 3000 tons for stockpiling. Stockpiling contracts are expiring and aren't being renewed. Similarly, the Air Force cutback is already felt. Sources in the industry believe that at least 95 pct of titanium used goes into defense work, the greater part to Air Force.

Meantime, like a snowball going downhill, titanium continues to gain capacity. From 13,200 tons in 1956, the capacity figure should hit 25,000 tons at the end of 1957. It may not stop there. At least 11,000 tons of additional capacity is being considered, though the titanium market picture of the past 30 days has caused foot-dragging.

Drop in Operating Rate—On the



ONE CANDLEPOWER: Two new methods in the process of making titanium sponge were developed by Armour Research Foundation, Illinois Tech, Chicago. (1) A single candle provides enough heat to produce titanium tetrachloride from potassium chlorotitanate. (2) Latter is now precipitated from low grade ilmenite.

new capacity basis, titanium would drop from 100 pct of capacity operation through 1956, to as low as 50 pct of capacity at the end of this year. Some producers have already scheduled 60 pct operations beginning this July. The lower level would (a) discourage new investment, (b) shave profits desperately thin, (c) wither permanently expansion delays that, at the moment, are regarded as only temporarily stalled.

Worse: The axe is descending at a moment when titanium is breaking the barrier to wider acceptance in aircraft, electronics, and naval work. A new aircraft on the drawing boards calls for a tenfold increase in titanium used per ship. A new aircraft engine on the drawing boards calls for extensive use of titanium by a manufacturer who discontinued titanium use entirely on the aircraft he is currently producing.

TITANIUM—IS THE CURVE REVERSING?

Titanium sponge production, in tons

1956	**13,215**
1955	**7,300**
1954	**5,370**
1953	**2,280**
1952	**1,100**
1951	**495**
1950	**75**

Figures based on industry estimates.

Where They Stand—The sponge producers: Du Pont rated at 5400 tons per year; Titanium Metals Corp. of America rated at 6000 tons; Electro Metallurgical at 7500 tons; Cramet at 6000 tons; Dow at 1800 tons. At least four have considered expansions, and a sixth producer earlier had announced its intention of entering the field.

Titanium may be in real trouble. Long range prospects are excellent. But long range prospects don't pay taxes or payrolls. Unless the Air Force clarifies its stand and boosts procurement as once planned, it soon will be time for one more of those "agonizing reappraisals."

The Outlook—In 1954, the government wanted 37,500 tons of capacity by 1956. In fairness to the services, it should be pointed out that a considerably more realistic report called for 15,000 tons of finished products or 30,000 tons of sponge capacity by 1957, based on projected Air Force requirements.

Though talk of an eventual Air Force requirement of 150,000 tons per year emerged in congressional hearings, this figure was never taken seriously. In either case, next year looks like a bad one for titanium.

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Billion Tons of Ore

Pickands Mather & Co., Cleveland, will lease and operate an iron ore field at Wabush Lake, Newfoundland, estimated to contain over 1 billion tons of ore.

The U. S. firm had made a preliminary agreement with Canadian Javelin Ltd., in 1956 covering two square miles of this area. The new agreement covers the rest of the area, which Javelin has under lease from the province of Newfoundland.

Operating Company — Pickands Mather, and The Steel Co. of Canada, Ltd., have formed Wabush Iron Co., Ltd., as an operating subsidiary. Canadian Javelin will have a participating interest.

The ore is low grade, but thought to be easily concentratable.

HUSTLER: Convair's B-58 is nation's first supersonic bomber. It carries detachable pod, depending on mission.

Air Force Cuts Only Skin Deep

Don't shed too many tears over threatened cutbacks on Air Force spending.

Lost in all the shouting are assurances that the air arm won't be hurt seriously by recent directives. — By R. M. Stroupe.

■ Whatever happens to Air Force spending, it isn't likely to be as severe a blow to suppliers as the gloomcasters indicate.

On the face of it, the situation for the air service looks bleak. The Air Force was a principal target for two recent Defense Dept. directives affecting current and future spending. One deals with outlays up to June 30 this year; the other orders an end to long-range obligations not fully backed by authorized funds.

Lid Clamped Down—The first order from Defense Secretary Wilson told the Air Force it must reduce its current contracting by $250 million. In effect, this is a postponement of spending until after the new fiscal year begins on July 1. Obvious purpose of the directive is to put a lid on military contracting for this present period only.

But there is an escape route for Air Force buyers. The holddown on contracting has a specific time limit. To make certain the service places the orders it wants to place, the buyers meanwhile can issue letters of intent to producers.

Installment Crackdown—For instance, if the Air Force wants to buy new jet engines it can give the supplier a letter of intent stating what it wants. This permits the engine manufacturer to begin producing, with the knowledge that the service will contract for the products.

Potentially more serious to contractors with the Air Force is the crackdown on so-called installment buying. If followed to the letter, the prohibiting order would put an end to the practice of contracting for certain long-lead-time items.

The effect of this order, though, probably will not be especially severe for either the Air Force or its suppliers. Donald Quarles, Deputy Defense Secretary and until recently the Air Force Secretary, doesn't think there's cause for alarm.

Wilson's Successor—The views now expressed by Mr. Quarles gain special importance because of the coming departure of Charles Wilson from the Defense Secretary's post. If Mr. Quarles assumes the top Pentagon position, the Air Force can look with some assurance for a sympathetic reception for its pleas on long-range programs. And if the Secretary's job goes to someone else, Mr. Quarles may put in a helpful word or two on the Air Force requests.

Essentially, the new Pentagon moves are aimed at a tighter control of the enormous outlays for defense. So far as the Air Force is concerned, there will be some reductions in spending, but no drastic cutbacks.

Oxygen Boosts Furnace Output

Biggest ever built, U. S. Steel's new oxygen plant at Duquesne may increase ferromanganese output by 25 pct.

Oxygen usage in steel operations gains in importance.

■ Use of a new oxygen producing plant at U. S. Steel's Duquesne Works is expected to give a 25 pct increase in ferromanganese output of the installation's blast furnaces.

Now in operation, the plant (see cut)—described as the biggest ever built for a steel mill—has a capacity of 500 tons a day. It provides oxygen for these operations: (1) 95 pct purity product (about 90 pct of output) goes directly to two ferromanganese blast furnaces; (2) 99.5 pct purity product (about 10 pct of output) is sent to pipelines servicing electric furnaces, scarfing and cutting operations and other applications; and (3) a stream of liquid oxygen for standby storage.

On the Increase — Linde Co., which built the new plant, will own and operate it. In addition, the firm will provide supplementary service, bringing in oxygen from outside plants to meet peak demands at Duquesne. A further reserve will be available through provision of a 10 million cu ft tank at the mill.

The Duquesne plant points up the growing importance of oxygen to steel operations. Mills have increased their oxygen usage from 30 cu ft per ingot ton in 1930 to 200 cu ft per ton today, Linde estimates.

While the big use of metallurgical oxygen until now has been for steelmaking, blast furnace applications are not new. U. S. Steel started tests on the use of oxygen at Duquesne in late 1954. Weirton Steel began experimentation in 1946.

U. S. Steel's furnace was installed after a three month test sold the benefits of the process.

Containers Keep Sales Stamina

Chemical Use Offsets Petroleum Losses

Steel shipping containers hit a production high in 1956—almost 115 million units.

And despite a battle with rising costs, manufacturers are confident of continued market growth.

▪ Steel shipping containers continue to ride the crest of the industry's 1956 production peak. Total industry output last year was almost 115 million units, a new record. The total broke down to about 79.8 million pails, 9.6 million light drums and 25.4 million heavy drums. And the record was achieved despite a sharp drop in shipments to the industry's traditional best customer, petroleum companies.

This picture is highlighted in a new study by Livingstone Keplinger, president of the Steel Shipping Container Institute. Using 1940 as a base, Mr. Keplinger finds that 1956 container output was up 115 pct. By comparison, overall industrial production for the period rose 113 pct, and passenger automobile output 57 pct.

Chemical Sales Help — Sales to the zooming chemical industry have almost entirely offset drops in drum shipments to the petroleum industry, prime market of years past. Oil company use of heavy drums in 1956 was 31.2 pct under the average figure for 1947-49. But chemical industry consumption was up 81.3 pct. Chemical industry use of light drums soared 137.3 pct over the base period, while petroleum use went up only 1.1 pct.

Drop in demand for new drums by the oil industry stems from the growing practice of reusing heavy drums, plus almost complete halting of lubricants exports to Europe, Africa and the Far East. Development of linings for interior surfaces of drums has been an important spur to chemical use. Container makers claim that the new linings make it possible to ship almost any product in steel without danger of corrosion or product contamination. The industry, pushing development of new lining formulas, is sponsoring a research program at Battelle Memorial Institute.

Pricing Defended — The new study counters complaints about container price increases by stressing that rate of price increase for the industry is still often below rate for products shipped in the containers. Mr. Keplinger points out that container price increases largely reflect rises in wages and prices in the basic steel industry. In 1956, the container industry used 1,018,873 tons of steel, making it the nation's second largest user of sheet steel, exceeded only by the automotive industry. Approximately 60 pct of the cost of steel shipping containers is raw material in the form of steel sheets and steel closures, the study reports.

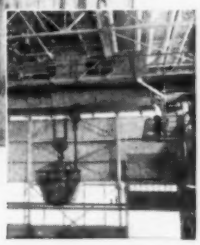
Looking ahead, container makers see increasing demand for their products. Growth of chemical, petrochemical and atomic energy industries are expected to provide new markets. Materials and fabricating techniques are steadily improving, and lighter gage steels are showing special promise in new container applications.

Containers Bounce Back in New Markets

Source: Steel Shipping Container Institute
1957—Iron Age Estimate

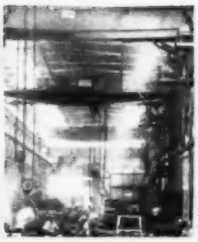
Pulling pattern from mold for 12-ton casting

EASY UP does it!



Handling sandslinger sand bucket

Spotting 15-ton casting on flat-car for inter-plant transportation



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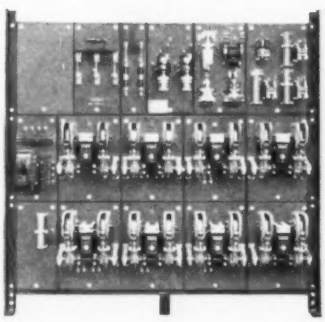


• Here's another example of preference for EC&M *Engineered* Crane Control for industry's tough and critical handling jobs. For its new foundry, The Bullard Company, large eastern machine tool builder, selected EC&M Control for 11 new cranes powered by A-C motors. A thorough study of EC&M apparatus and engineering showed that EC&M circuits were the safest, simplest, and that speed-torque curves of EC&M's EDDYMAG Hoist Control were the finest available. Acceleration by the EC&M Frequency Relay Method was another plus value.

You're ahead in more ways than one when you specify EC&M Control for cranes

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

7735

MORE THAN DOUBLE: Detroit plant capacity of E. F. Houghton & Co., industrial oil and chemical manufacturer, will enlarge by that amount when scale-model takes shape in actual facilities before end of 1957

Brainard Launches Strapping Project

Brainard Steel Div., Sharon Steel Corp., Warren, O., has a three pronged program for boosting sales of steel strapping.

Walter A. Garrett, Sales Manager, announced the formation of a group of Brainard strapping specialists who will consult with and advise steel mills on more efficient and economical use of steel strapping. Mark D. Rector will head this project.

New Output — Brainard also pulled the switch on new production facilities to boost output by 2,000 tons per month.

To help sell the new capacity Brainard is marketing a new air powered strapping tool, for heavy duty strapping. Known as PNC, the new tool weighs 12 lb. and features tensional uniformity, and faster operation. It straps and cuts in the same operation.

Mission To India

Four U. S. machine tool experts left this week (June 11) for a nine-week tour of Indian machine tool and metalworking industry.

Purpose of the trip is to estimate demand for U. S. equipment in India over the next decade, and to survey machine tool production companies in the Asian country.

Study Facilities — The group, including three from industry and one government expert, will study the type of facilities in which India builds machine tools; types of supporting facilities for casting and other purposes; and types of tools being built there.

They will also assess Indian statements, made recently, that the market for U. S. tools in India will be "tremendous" over the next 19 years. The high assessment of potential Indian purchases is doubted by many experts.

Members—The mission will consist of George E. Merryweather, vice president, Motch and Merryweather Machinery Co., Cleveland; Roy Jacobs, chief industrial engineer, Jones and Lamson Machine Tool Co., Springfield, Vt.; Paul Hawkins, export sales manager, Monarch Machine Tool Co., Sidney, O.; and Robert E. Flemming, Metalworking Equipment Div., Commerce Department's Business and Defense Services Administration.

SBA Here To Stay?

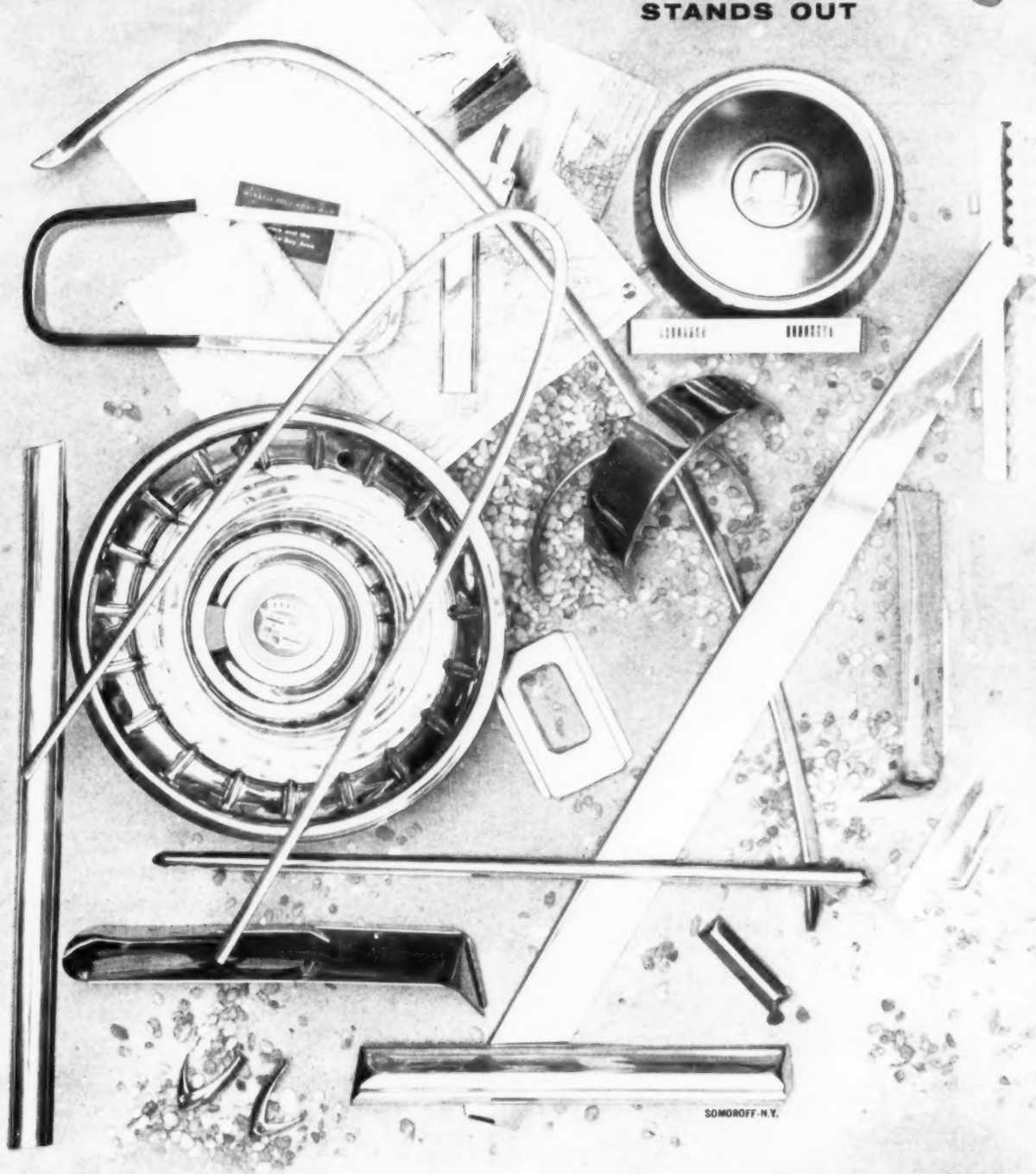
Small Business Administration, successor to the Reconstruction Finance Corp., is on the way to becoming permanent.

SBA, formed as a temporary agency in 1953, would be permanent under proposed legislation approved by the House Banking Committee. The bill would also more than double SBA's lending authority, raising the total from $230 million to $500 million. It would also lower the maximum interest on SBA loans to 5 pct, from the present 6 pct.

Abolish Loan Board—In another step toward making SBA permanent and independent, the pending measure would abolish the three-man loan policy board—the Secretaries of Commerce and the Treasury, and the SBA Administrator.

In addition to making direct business loans and participating in loans with private banks, SBA also makes disaster loans, helps small business secure government contracts, and provides advice for management of small firms which are having a hard time.

IN AUTOMOTIVE TRIM, TOO, Sharonsteel Quality STANDS OUT



Only Stainless Steel has really *lasting* beauty that defies flying stones, road chemicals, salt air, rust and corrosion season after season. Discerning automotive designers used more Sharon Stainless Steel this year than ever before for exterior and interior trim and accessories.

SHARONSTEEL

For 56 Years a Quality Name in Steel

SHARON STEEL CORPORATION, SHARON, PENNA.

176

CHICAGO, CINCINNATI, CLEVELAND, DAYTON, DETROIT, GRAND RAPIDS, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, NEW YORK, PHILADELPHIA, ROCHESTER, SAN FRANCISCO, SEATTLE, MONTREAL, TORONTO

BRIDGEPORT BRASS
COPPER ALLOY BULLETIN

Bridgeport Reporting New Developments in Copper-Brass Alloys and Metalworking Methods

SPECIFY DURONZE WHEN YOU NEED A TOUGH, DURABLE ALLOY

by M. A. BUELL
Chief Staff Metallurgist

Duronze is one of the more versatile of the bronzes, combining the strong corrosion-resistant properties of copper with many of the mechanical properties of mild steel. It is available in several alloy compositions, the most popular of which are as follows:

	Duronze 606	Duronze 609	Duronze 707
Copper	96.00%	98.0%	91.0%
Silicon	2.85	2.0	2.0
Aluminum	–	–	7.0
Manganese	1.00	–	–

The Duronze family's high tensile strength and good machining make it a popular alloy for bolts, nuts, gears, valve stems and parts, and marine hardware.

Duronze 707 is best for machined and hot-forged parts. It does not, however, lend itself to cold-forming operations.

Duronze 606 and 609 offer, on the other hand, excellent cold-working properties in addition to excellent corrosion resistance.

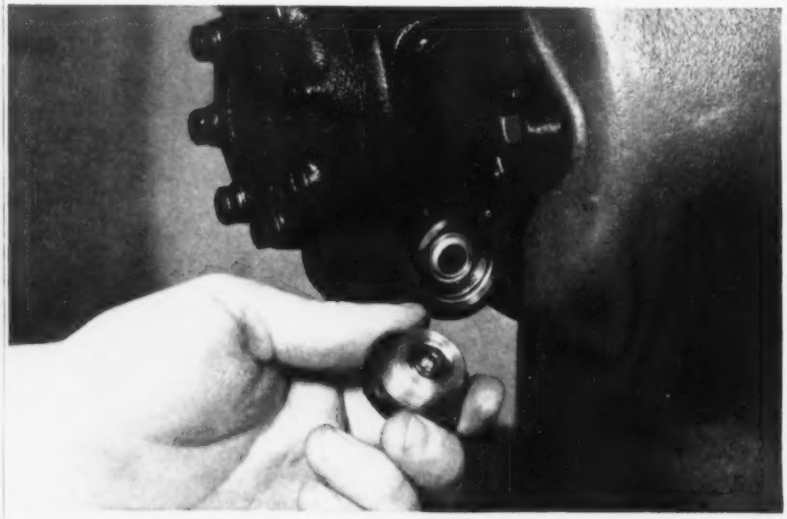
Full details on any Duronze alloy are available from your nearest Bridgeport Sales Office.

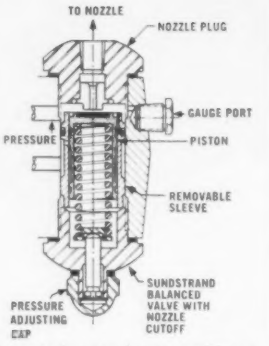
SOLVING YOUR PRODUCT AND PRODUCTION PROBLEMS

Of all the data, records and files kept by Bridgeport Technical Service, one of the largest is marked "Product and Production Problems—Solved." The experience brought to bear on a problem you may have with your product, or in the production of it, comes, in large measure, from cases similar to yours and frequently from cases exactly like yours.

Couple this successful experience with extensive facilities and you have a combination at your disposal that can be of great benefit to you. Bridgeport Technical Service works directly through your Bridgeport Salesman; when you outline for him your particular copper alloy problem you're calling on Bridgeport Technical Service.

Bridgeport Duronze 707 Helps Cut Cost of Vital Oil-Burner Pump Part





Schematic drawing showing position of nozzle plug insert in the burner valve assembly.

Bridgeport Duronze 707 nozzle port insert shown with nozzle plug.

The nozzle port insert for oil-burner pumps manufactured by Sundstrand Hydraulic Div., Sundstrand Machine Tool Co., Rockford, Ill., performs two vital functions: it provides positive fuel cutoff and prevents fuel leakage during stand-by periods.

For these reasons, metals specifications and machining requirements are exacting. Resistance to continual corrosive effects of fuel is a must. Also, the material for the part has to be machined to close tolerances and must be capable of good surface finishes.

A Bridgeport salesman noticed that this insert was being machined from leaded phosphor bronze. He studied the materials specifications and production methods, then recommended a shift to Bridgeport Duronze 707 (Aluminum Silicon Bronze).

First, Duronze made possible substantial savings in materials cost. Second, Duronze's resistance to fuel-oil corrosion was equally as good as the previously used metal. Third, although the machinability of Duronze was slightly less than leaded phosphor bronze, the Bridgeport man's recommendations made the difference in machining time negligible.

The results speak for themselves. Sundstrand now uses Bridgeport Duronze 707 for the nozzle port insert on their *entire* line of oil-burner pumps.

BRIDGEPORT BRASS

Bridgeport Brass Company, Bridgeport 2, Connecticut. Offices in Principal Cities
In Canada: Noranda Copper and Brass Limited, Montreal

Rear Admiral Charles R. Khoury

Busy Future for Lakes Shipping

The ifs and maybes of the St. Lawrence Seaway project are just so much talk to this old sailor.

Its completion will bring heretofore unknown industrial activity to the region, he says.

His trained Pittsburgh Steamship Div. crews are expected to play a major part.

Rear Admiral Khoury: From the top chair, you can see the whole picture.

▪ When the first ocean-going seamen make their way up the St. Lawrence Seaway in 1958, they will find the natives friendly. In fact, they will find the big chief of the Great Lakes biggest fleet is one of their own—Rear Admiral Charles R. Khoury, formerly of the U. S. Navy, the merchant marine, and now president of Pittsburgh Steamship Div., U. S. Steel Corp.

As a comparatively recent convert to fresh water navigation, Adm. Khoury has been boning up on Great Lakes trades. What he has learned he translates into words of encouragement for every landlocked midwesterner who is concerned with the area's industrial development.

Seaway's Value—"There's a lot of talk these days about the Seaway and the effect it will have on our industry. There undoubtedly will be some kinks to iron out when the Lakes are finally opened to so-called salt water traffic," he explains, "but I think it will do a lot for all of us and our cities."

The Admiral sees the Seaway as a challenge — but a bright one. "There is still a vast supply of raw materials in the north country, and I think the job we will be doing 10 years from today will surprise all of us."

Started Young — Adm. Khoury, whose red hair is beginning to turn gray at the temples, got his first taste of the sea while a Boston schoolboy on summer vacation. He shipped out as a crew member on a three-masted bark. When he finished his schooling he returned to the shipping lanes as an apprentice seaman. Eventually, he rose to command his own vessel.

During World War II, thousands of U. S. troops served under him while he was skipper of the USS Gen. John Pope. In the Korean conflict, he commanded the USS Gen. H. W. Butler.

Crew Pulls Together—Relieved of active duty in 1953, Adm. Khoury joined U. S. Steel as acting Vice President—Operations of the Isthmian Steamship Co. On March 1, 1957, he took the helm of Pittsburgh Steamship Div.'s 57-ship fleet.

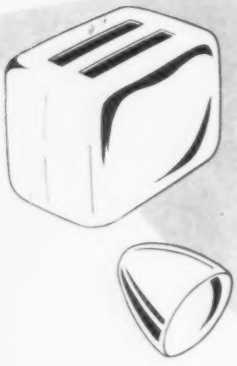
Running an important segment of a giant industry is not unlike commanding a ship, the Admiral finds. "The safety, health and welfare of each seaman are important," he states. "Every man on board is needed, that's why he is there."

CMP

RESTRICTED SPECIFICATION
COLD ROLLED STRIP STEEL

Serves Typical Low Carbon End Use Requirements Such as these . . .

SIZE	8 x .045
ANALYSIS	1010
FINISH	#2 finish
HARDNESS	Non-Scalloping quality
THICKNESS TOLERANCE	± .0005 Incl. crown
WIDTH TOLERANCE	± .005
COIL SIZE	250# per inch of width
PACKAGING	Skidded



SIZE	12 x .032
ANALYSIS	1010
FINISH	#3 finish
HARDNESS	#4 Temper
THICKNESS TOLERANCE	± .0005 Incl. crown
WIDTH TOLERANCE	± .005
COIL SIZE	up to 200# per inch of width
PACKAGING	Paper interleaved— skidded and shrouded

SIZE	4 x .065
ANALYSIS	1010
FINISH	#2 finish
HARDNESS	#3 Temper
THICKNESS TOLERANCE	± .0005 Incl. crown
WIDTH TOLERANCE	± .005
COIL SIZE	Cut lengths
PACKAGING	Skidded

Many times, by varying processing methods, CMP is able to develop properties in cold rolled strip steel which greatly facilitate production operations and/or give the product superior qualities without adding to end product cost. End result is lower costs through improved products or better assembly and improved yield.

We believe you will find it worthwhile to investigate the possibilities of CMP Restricted Specification Cold Rolled Strip Steel applied to your production.

THE 3 IN 1 SOURCE

FOR YOUR
COLD ROLLED STRIP STEEL

Now there are three CMP plants with facilities for production of "Restricted Specification" cold roiled strip. Strategic locations at Youngstown, Indianapolis and Los Angeles, provide the security of 3 sources of supply plus the close working relationship which these local production centers make possible.

CMP PRODUCTS

Low Carbon, High Carbon — Annealed or Tempered, Stainless, Alloy, Electro Zinc Coated.

THE COLD METAL PRODUCTS CO.
GENERAL OFFICES: YOUNGSTOWN 1, OHIO
PLANTS: YOUNGSTOWN, INDIANAPOLIS AND LOS ANGELES
SALES OFFICES: NEW YORK - CLEVELAND - DETROIT - INDIANAPOLIS
CHICAGO - LOS ANGELES - SAN FRANCISCO

CMP

Will Consumer Spending Lag?

Spending habits in next two months may determine business trend for the rest of the year.

Pay raises coming may help unless higher prices eat up stimulating effects.

■ Key points to watch in the weeks ahead are those interlocking factors, personal income and consumer spending.

In recent months, you may have blamed a decline or leveling off of your business on inventory control or liquidation. Particularly in the basic industries, inventory control has absorbed much of the blame for declining production rates.

Still Increasing — Meanwhile, consumer spending has gone right on increasing. The first quarter annual rate of $275.0 billion is $9.3 billion ahead of the rate for all of 1956.

But as a metalworking executive, you haven't shared in this big spending spree. The bulk of the increase in consumer spending is in non-durables and services. Comparatively little of the gain is in durable goods, where most of metalworking is chiefly concerned.

Another factor: About half of the apparent gain in consumer spending is absorbed in higher prices. Only the remaining half is reflected in gains in real purchasing.

Big Economic Factor—As long as consumer spending stays on the increase, business will continue good. Consumer spending and government spending together constitute the bulk of the gross national product.

Regardless of the current economy talk in Congress, government spending will stay close to its present level through the next fiscal year. This puts consumer spending as the determining factor.

. . . Pay Increases May Help

Purchasing Power Down—There is a lot of evidence that the level of income is leveling off. In terms of purchasing power, it is lower now than it was a year ago. This is because a combination of fewer hours per week and higher prices has eaten up gains in pay.

But consumer income is going to get a shot in the arm within the next few weeks. Steelworkers will get an annual raise of 7¢ per hour (plus an increase in the increments between job classes), the autoworkers will get 6¢ more, and many others with long-term contracts will get similar automatic wage boosts.

Escalator Clauses — Millions of workers are now tied in with cost-of-living contracts. It's estimated that an increase of one-half a point in the consumer price index adds $80 million to the annual payrolls. Most workers with escalator contracts got a 2¢ per hour raise June 1 on that alone.

On the other side of the issue are prices. These wage increases will have to be compensated for in higher prices. What effect this will have on consumer spending will probably be determined by the extent of price jumps in consumer goods and whether consumer confidence is still strong.

While money spent on non-durable goods and services all contributes its share to the economy, durable goods spending remains the critical point to metalworking.

Lobbyists Face Close Check

Persuaders Not Wanted—If you have an interest in legislation before Congress, you should be encouraged by new interest in curtailing activities of the high pressure boys.

The trend in Congress is to make it more difficult for these "persuaders" to operate. A Senate committee is pushing for new, tougher rules on lobbying.

There's nothing wrong or illegal in any citizen attempting to further legislation that he favors or discouraging laws that would injure him. Your right to do that is not at issue.

Too Much Pressure—What Congress wants to do is put a check on pressure types or illegal methods that actually work against the honest businessman.

Congress has become irked by displays of arrogance and high-handed tactics. Latest plan is to require the General Accounting Office to maintain a continuing check on the activities of all lobbyists, with dishonest lobbyists subject to investigation or prosecution.

AUTOMOTIVE

Gas Turbine to Compete Soon

GM Aims at Military and Commercial Markets

All technical problems have been licked, GM engineers say. Only production kinks remain.

High fuel consumption is offset by bigger payload capacity. —By T. L. Carry.

▪ How close is the gas turbine to actual commercial production? Three General Motors engineers believe that it is nearly ready to compete with piston engines but only in certain commercial and military vehicles.

The three men, William A. Turunen, Robert Schilling and E. L. Baugh, presented their views in a paper before the summer meeting of the Society of Automotive Engineers in Atlantic City, N. J.

Three types tested—The engineers claim that gas turbines for heavy duty and military vehicles are practical and feasible and that no additional engineering breakthroughs are required.

GM's experience with gas turbine engines goes back several years. Altogether, the company's research staff has designed, built and tested three different gas turbine engines. These engines were installed in two passenger cars, a bus and finally in a Chevrolet truck called the Turbo-Titan.

Choice of Fuels—So far, tests with the truck have shown that under a normal rating of 50,000 lb gross combined weight, it has an acceleration rate from a standstill to 40 mph which is 27.5 pct better than a standard piston truck engine. On hills the turbine shows a 17 pct improvement in climbing.

The engineers are enthusiastic about the truck engine for many reasons.

First, gas turbines will run equally well on several fuels, from gasoline to No. 2 Diesel oil. This gives the truck operator the choice of the cheapest fuels available.

Payload Advantage — Although the economy of the present piston engine is slightly better than the turbine on a miles-per-gallon basis, the three men point out that this is not necessarily bad.

"Fuel economy is always important, but it must be considered in its proper perspective. The additional payload that can be handled by a turbine engine of comparable rating (to a piston engine) must be considered. The overall cost balanced against the revenue is the final criterion. In this respect, the gas turbine has a strong potential."

Trend to Big Engines—The future growth of super highways in this country is another factor favoring adoption of the gas turbine for trucks. As future highways are connected with city expressway systems, high speed, heavy duty trucks will soon become a reality.

This trend will create the need for larger engines to move the trucks at high speeds. Reciprocating engines will not be able to meet this need because they would be too large and too heavy.

The same holds true for future

SOFTER RIDE: Workers at GMC Truck & Coach Div. lower a new type hollow axle onto a truck frame. It has air bellows instead of steel springs and can withstand 16 times more twisting force than conventional axles.

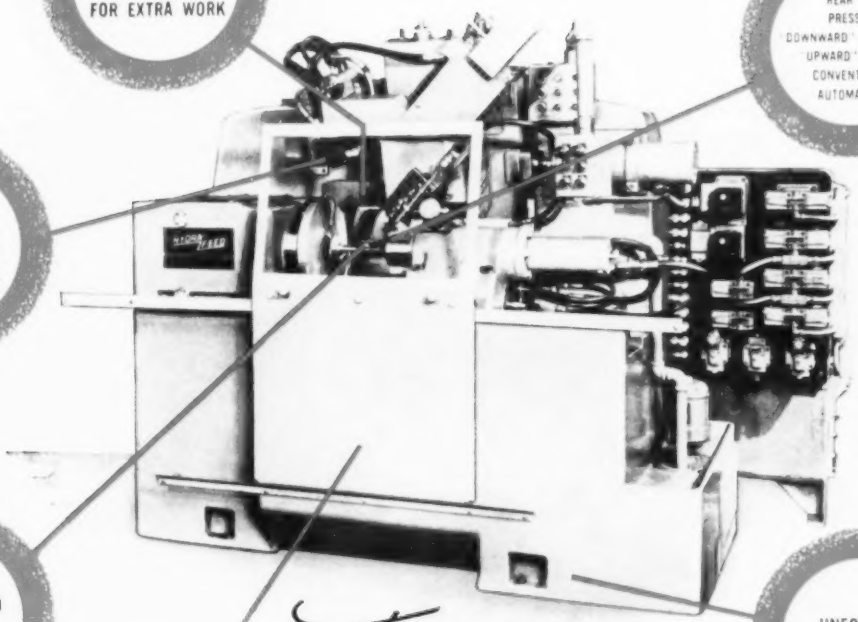
BULLARD

HYDRA-FEED LATHES

AUXILIARY REAR CARRIAGE AND TOOLING FOR EXTRA WORK

REAR TOOL PRESSURE "DOWNWARD" INSTEAD OF "UPWARD" AS ON CONVENTIONAL AUTOMATICS

TOP MOUNTING OF TRACER SLIDE AND TEMPLATE



UNOBSTRUCTED FRONT VIEW DESIGN

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RIGIDITY AND POWER FOR HEAVY CUTS

AVAILABLE IN FOUR SIZES

two models

Ruggedness, versatility and high production are outstanding advantages of the Bullard Hydra-Feed Lathes. Sizable reductions in finished piece cost are obtained with single setup machining of a broad range of complex shapes.

USE THIS COUPON FOR FULL DETAILS

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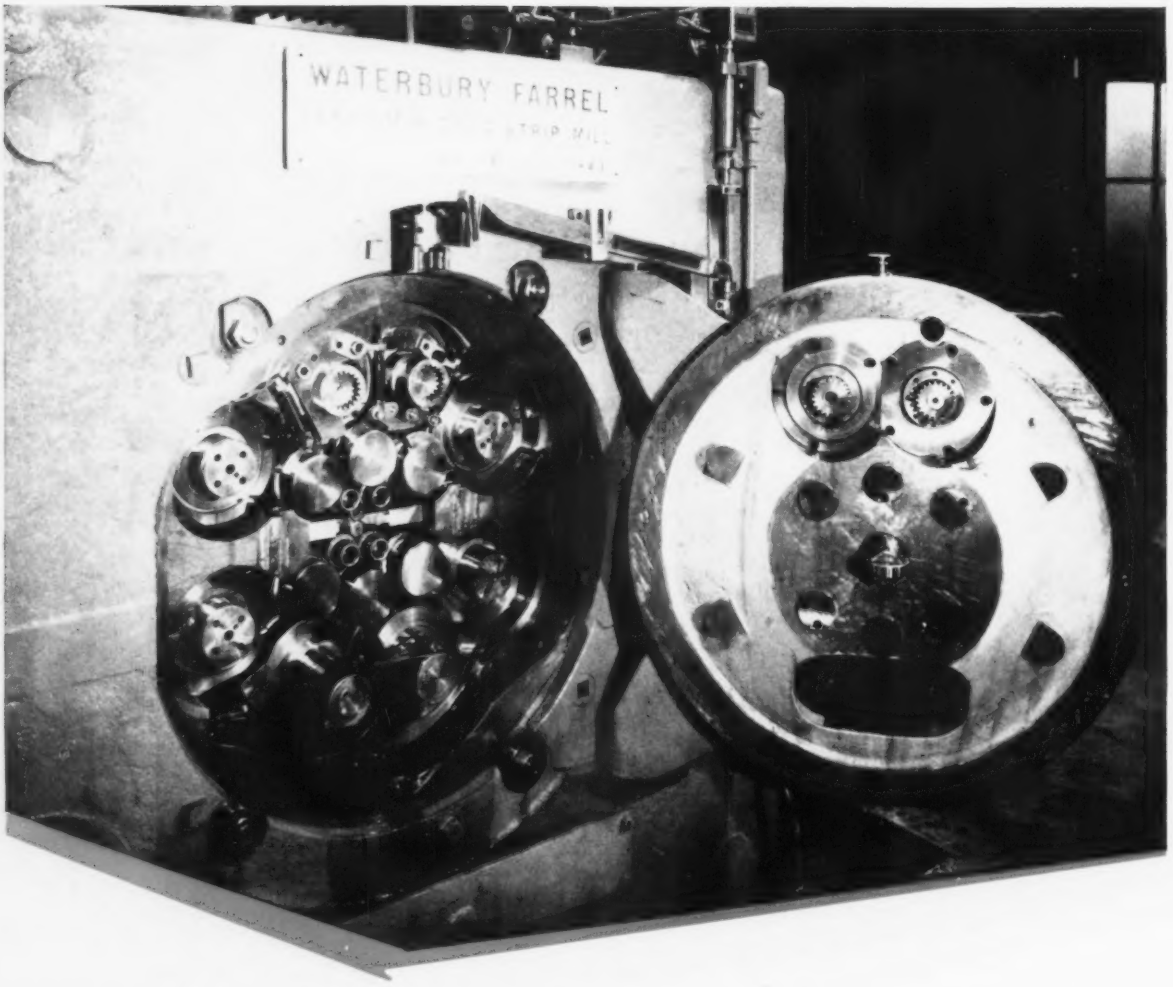

Why Bearings, Inc. engineers were asked to solve this bearing problem

FACT – This cold strip mill performs a 70% reduction on light gauge silicon steel. The bearings needed for this job must carry heavy loads. Yet, they must be precise to help insure continuous production of strip without gauge variation from end to end of the coil.

FACT – The plant in which this mill was installed called a Bearings, Inc. engineer who, after a thorough study of the equipment and its uses, recommended the correct replacement bearing for the application. The user knew, from past experience, that Bearings, Inc. engineers had full knowledge of all types of bearings and could recommend the best from the many lines Bearings, Inc. distributes.

FACT – When the O.D. of these bearings become indented by fragments or roll flattened from extended service, we have them ground in shaft sets to within .0002″ section height . . . a further service of Bearings, Inc. and the manufacturer of the bearings.

This is the bearing service and follow through you can expect from Bearings, Inc., your authorized distributor for all nationally known makes of bearings. This is why we are called by our customers for any bearing problem. We'd appreciate the opportunity of helping *you!* Call or write NOW!

Providing bearing service in the territories adjacent to our branches, listed below.

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INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
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WEST VIRGINIA: Charleston • Huntington • Wheeling
NEW JERSEY: Camden • **MARYLAND:** Baltimore
DELAWARE: Wilmington •
Subsidiaries: Balanrol Corp. • Buffalo, N.Y. • Kentucky Ball and Roller Bearing Co. • Louisville, Ky.

Automotive Production

WEEK ENDING	CARS	TRUCKS
June 8, 1957	130,515	23,692
June 1, 1957	82,431	17,519
June 9, 1956	104,984	21,480
June 2, 1956	77,433	17,466
TO DATE 1957	2,872,607	482,310
TO DATE 1956	2,762,229	508,908

*Estimated. Source: *Ward's Reports*

buses. "Heavier coaches can be expected to travel over the highways at higher speeds and will very likely operate between terminals located next to limited access thruways."

Meets Military Needs—In addition to trucks and buses, the GM engineers feel that gas turbines will find other uses in such off-the-road equipment as tractors and earth moving equipment.

They believe that the gas turbine is ideally suited for military adoption. Some of the advantages cited are high power to low weight, air cooling, multi-fuel appetite, reliable cold weather starting, minimum maintenance and reliable operation.

They claim that there is no known military engine in use today that can meet all these requirements.

Some of the other advantages are:

Production Problems—Oil consumption is very low because oil does not come in contact with engine fuel. The ignition system is simple and is required only for starting. The turbine requires neither radiators, fans or anti-freeze because it is air cooled.

The three men believe that all the engineering problems have been licked. But they point out that what is needed now is additional work in manufacturing. The question of manufacturing costs is still largely unresolved because gas turbines have not been built in quantity.

One Bottleneck—But generally, the turbine engine consists of simple castings and stampings that require no new manufacturing methods. The one exception is the fabrication of turbine wheels and it poses a difficult problem which the three men say will require a great deal of attention.

Large quantities of high temperature alloys are needed in the hot areas of the engine but it is believed that these requirements can be met by further development. It is pointed out that a great deal of progress has been made during the past year both in the field of high temperature metals and fabrication techniques.

With this in mind, it is important to remember when comparing the present turbine with the piston engine that the turbine is only at the beginning of its development cycle.

Wheels in Color

Colored stainless steel wheel covers are now available as optional equipment on all 1957 Oldsmobiles.

The outer rim of the cover is a broken ring of color in three sections. When the wheel is in motion, it gives the appearance of a solid line of color 1.5 in wide.

In addition to the extra styling that the colored covers give to the car, they also have what Oldsmobile claims is a very effective theft-resistant feature.

The new cover is attached to the wheel rim with five retaining clips. These clips minimize the danger of theft and also serve as a protection against thewheel cover coming off on the road.

Production Race

Auto production figures for May show that General Motors continues to lag behind both Ford and Chrysler, compared with 1956.

GM's total car production last month was 232,676 compared to 241,578 for the same period a year ago.

Chrysler Corp. now showing the greatest improvement with a total output of 123,641 compared to 73,757 for May, 1956.

Ford's production has also increased. Auto production last month was 159,128. In May of last year it was 141,650.

Only two GM cars, Pontiac and Cadillac, made more cars last month than they did for the same time in 1956.

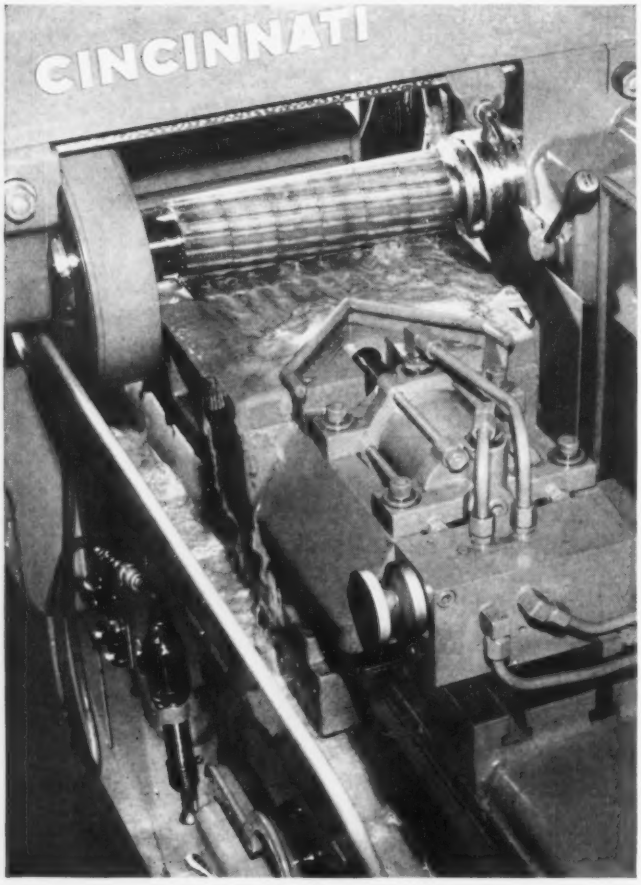
THE BULL OF THE WOODS By J. R. Williams

WHAT'S TH' GUY RUBBERNECKIN' FOR? ALL THIS BUNCH IS ON TH' SAME WAGE SCALE, SO WHAT'S HE EXPECTIN' TO SEE?
WELL, TH' GUY WHO'S WORTH LESS AN' GETS AS MUCH AS TH' ONE WHO'S WORTH MORE IS TH' ONE WHO'S TH' MOST ANXIOUS TO SEE THAT OL' FATHER UTOPIA DON'T MAKE ANY MISTAKES -- I MEAN CORRECTIONS!
THE SLEUTH
J.R. WILLIAMS

POWERMATIC

Lives Up To Its Name

Takes 14½" Wide Cut in One Pass



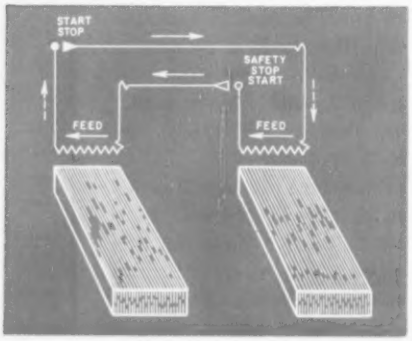
The Powermatic automatic cycle diagramed at the right combines high production with high quality to mill the teeth in 3700 hack saw blades per hour.

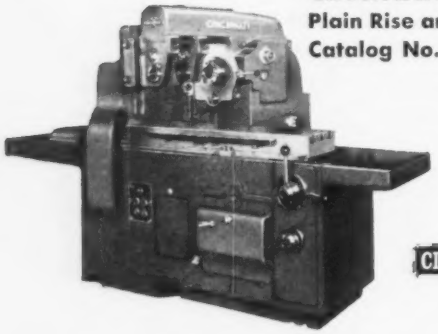
Combining a high percentage of usable power with automatic cycles is the specialty of Powermatic Milling Machines. The one illustrated here does the job to perfection for a prominent manufacturer of saw blades . . . **it takes a 10½" to 14½" wide cut in one pass, over two banks of parts, with automatic cycling of the table and spindle carrier.** ¶ This Powermatic is a plain automatic rise and fall style, 36" table traverse. Two hydraulic clamping fixtures with safety interlock, each holding 288 parts, are mounted on the table. The machine takes a "climb-milling" cut over both banks of parts, a distinct advantage in producing a uniform finish.

3700 saw blades are milled per hour at 87% operator efficiency

You will be interested in what makes this Powermatic setup a low-cost producer for similar work in your shop. Standard features include automatic backlash eliminator; automatic spindle stop; Dynapoise overarm; cycle selectors for automatic cycles. And Cincinnati engineering service is assurance of the most economical production of your components. Would you like to know more about CINCINNATI® Powermatic Milling Machines? You will find brief specifications in Sweet's. For complete data, write for catalog No. M-1913-1.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO





CINCINNATI POWERMATIC
Plain Rise and Fall Milling Machine.
Catalog No. M-1913-1.

CINCINNATI

MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS
METAL FORMING MACHINES • HARDENING MACHINES • OPTICAL PROJECTION
PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS

New Policy Aids Small Business

How Multiple Award Contracts Work

Defense contracts will have a portion set aside for small business.

Small suppliers will get a break in matching bids against open bidding.—By G. H. Baker.

▪ Small suppliers of items to the military find their chances to get a share of multiple-award contracts are improved.

They will be able to file more economical bids for these procurements split among a number of suppliers, as Sen. Saltonstall, R., Mass., figures it. He bases his prediction on a Defense Dept. policy change applying to orders in which a share has been set aside for small business.

Purchases Set Aside—For example, the Army might call for 200,000 units of a metal fitting for a piece of transportation equipment. Part of the planned purchase—perhaps 100,000 units—would be set aside for small business handling. The remainder would be open for bids by suppliers of any size.

On the open portion of the procurement, the Army gets a number of bids. The five lowest bidders, who are prepared to supply 20,000 units each, offer a unit price ranging from $1 to $1.50.

How to Bid—Formerly, small suppliers bidding on the 100,000 units set aside would have had to match the average figure—$1.25, in this case—of the successful low bids. But often these small firms could not produce and sell at the average price and thus lost a possible award.

Now these suppliers need only match the highest of the successful bids, rather than the average figure. A gain of several percentage points in the share of awards handled by small business is foreseen by Sen. Saltonstall.

Freight Rates Climb

Railroad freight rates are going up again, this time by about 10 pct.

Most of the nation's railroads have filed applications for higher rates with the Interstate Commerce Commission. Indications are that the ICC will grant most of it.

Specifically, the rate situation pending at the ICC is this:

Early this year, the ICC granted a 7 pct rate rise to eastern railroads. Western and southern roads were granted a 5 pct rise.

Now, the eastern roads are asking an additional 15 pct increase in rates so as to bring the total rise in rates to 22 pct. Western roads want an extra 17 pct. The southern roads seek a 10 pct rise.

Truckers Will Follow — The usual exceptions and hold-downs (coal and iron ore, for example) in the tariffs actually will reduce the overall rate increase proposed by eastern and western lines so as to produce an average 17.2 pct increase, one major eastern road (the Pennsylvania) estimates.

No matter where your plant is located, you can expect to pay more in railroad freight rates. And truckers are expected to follow suit soon, so it will be almost impossible to avoid higher freight costs.

Courts Will Enforce Arbitration

Clauses Stand—Arbitration gains new, nationwide importance as a method for settling differences between management and labor.

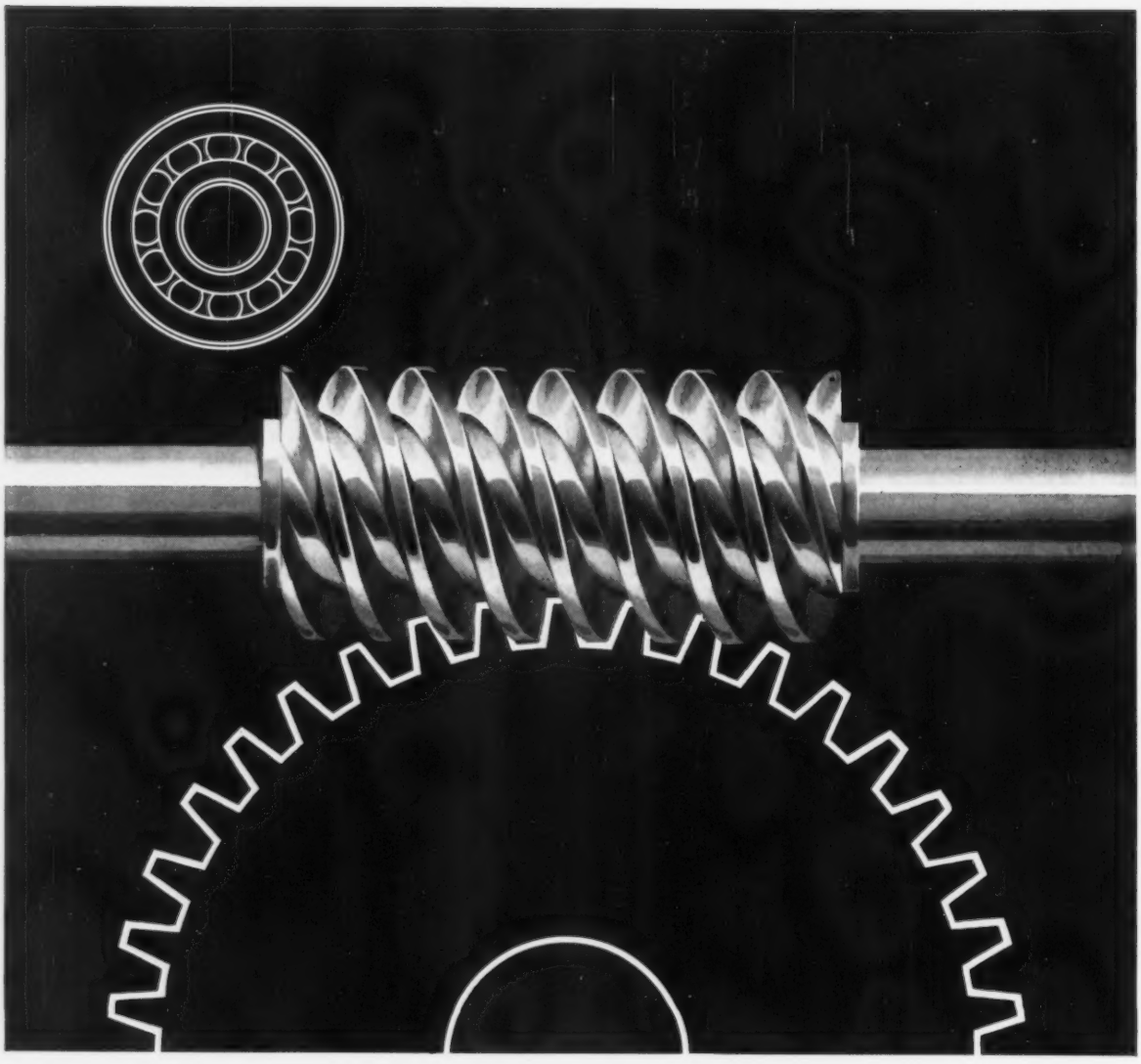
A ruling just made by the U. S. Supreme Court gives added weight to arbitration clauses in management-labor contracts. In a seven-to-one decision, the court says federal courts are empowered to enforce the clauses, no matter how the state laws read.

Sweeping Effects—The decision, as the court points out, does more than declare jurisdiction of federal courts over labor groups. It presents a policy whereby the courts are to back up arbitration agreements as a means of preserving industrial peace.

This is a significant action because of the widespread use of contract language declaring that labor complaints will be submitted to arbitration. Such a step is normally the final move before, or instead of, calling of a strike.

Three Cases—The Supreme Court ruling was handed down in three cases in which unions charged that employers had refused to abide by contract clauses calling for arbitration of disputes.

Two of the cases concerned textile union actions against Goodall-Sanford, Inc., at Springvale and Sanford, Me., and Lincoln Mills, former operator of a plant at Huntsville, Ala. The third involved the United Electrical, Radio, and Machine Workers against the General Electric Co.



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Esso Pen-O-Led EP lubricants are formulated with an extreme-pressure additive that includes a lead soap. Exceeding by far the minimum load carrying requirements of heavy industry, these lubricants offer sure protection to gears and plain journal and anti-friction bearings in rolling mills and other heavy-duty equipment subjected to overloading, shock-loading, or extreme localized pressure.

Since Pen-O-Led EP lubricants can be used in oil lubricated bearings as well as in gears, important savings can be realized by using *one* lubricant instead of two.

Pen-O-Led EP lubricants also prevent excessive wear caused by sliding friction – as encountered in worm gears. Pen-O-Led's protective film will not wipe off . . . it reduces friction, resists wear and rupture.

Other important advantages of Pen-O-Led EP lubricants: highly resistant to chemical deterioration and to separation . . . non-corrosive to steel, and to bronze and other copper alloys. Pen-O-Led EP lubricants are available in *eight* viscosity grades. Get the whole story on Pen-O-Led from your nearest Esso Standard Oil Company Division Office: Boston; Pelham, N. Y.; Elizabeth, N. J.; Bala-Cynwyd, Pa.; Baltimore; Richmond; Charlotte; Columbia, S. C.; Memphis; New Orleans.

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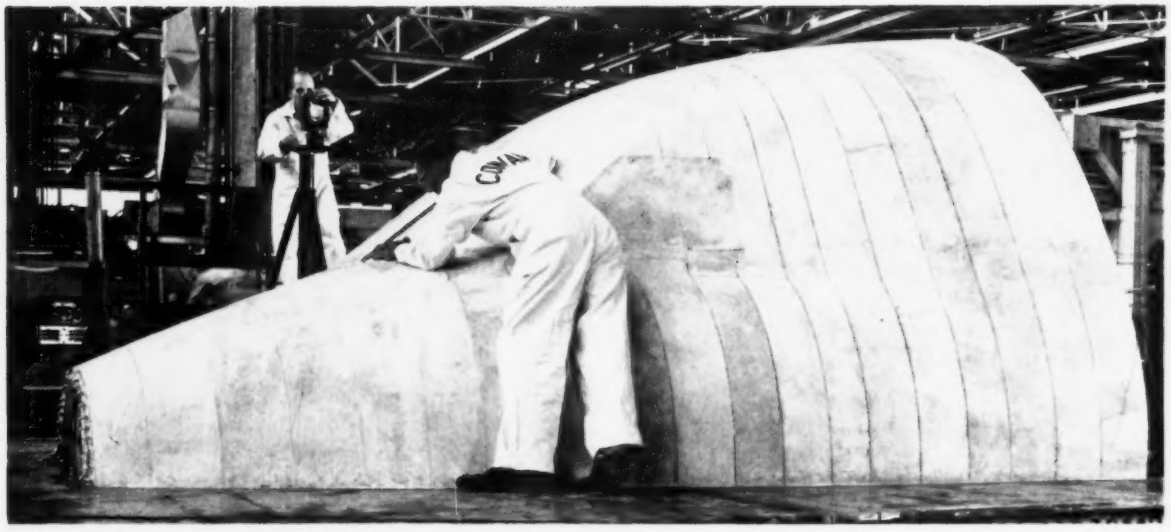


SHAPE OF THINGS TO COME: Technicians check contouring of plaster mockup which will set reference points in making dies for nose section of the Convair 880 jet transport, being built at San Diego.

Appliance Sales Head Higher

Far West gas appliance makers currently grossing sales of $65 million a year.

Developers of many new appliance designs, they expect to gain an even bigger share of the market.—By R. R. Kay.

■ Gas appliance manufacturers on the West Coast, largely a pioneering and inventive group, face an expanding business frontier. With their sales now at $65 million per year—about eight per cent of the nation's total—they're looking forward to a bigger slice of the national market.

Why the happy outlook? Right in their own back yard, West Coast manufacturers have (1) the nation's fastest-growing population and home-building area, and (2) giant growth of natural gas facilities. Ingenuity and appealing design boost the local product.

Natural Gas Gains — Gas appliances and equipment made there are already in big demand in the Pacific Northwest. Natural gas, from New Mexico's San Juan Basin, is flowing into the region for the first time. In Washington, Oregon, Idaho, Montana, Colorado, Utah, and Wyoming thousands of homes, apartment houses, commercial and industrial buildings are converting from manufactured gas to the higher Btu natural gas.

The West Coast's 87 gas appliance and accessory makers are centered in Los Angeles, with a few in San Francisco. Almost all of them now have dealerships or distribution tie-ins in Seattle or Portland, Ore., according to the Gas Appliance Manufacturers Assn. And wholesale lots of California-built heating units are heading to Washington and Oregon.

Heavy Steel Users—Business will really get rolling when the final linkup comes on the New Mexico-to-Canada pipeline. During 1957 the Canadian line from the Peace River natural gas reserves of Northern Alberta is due to tie in with completed U. S. lines.

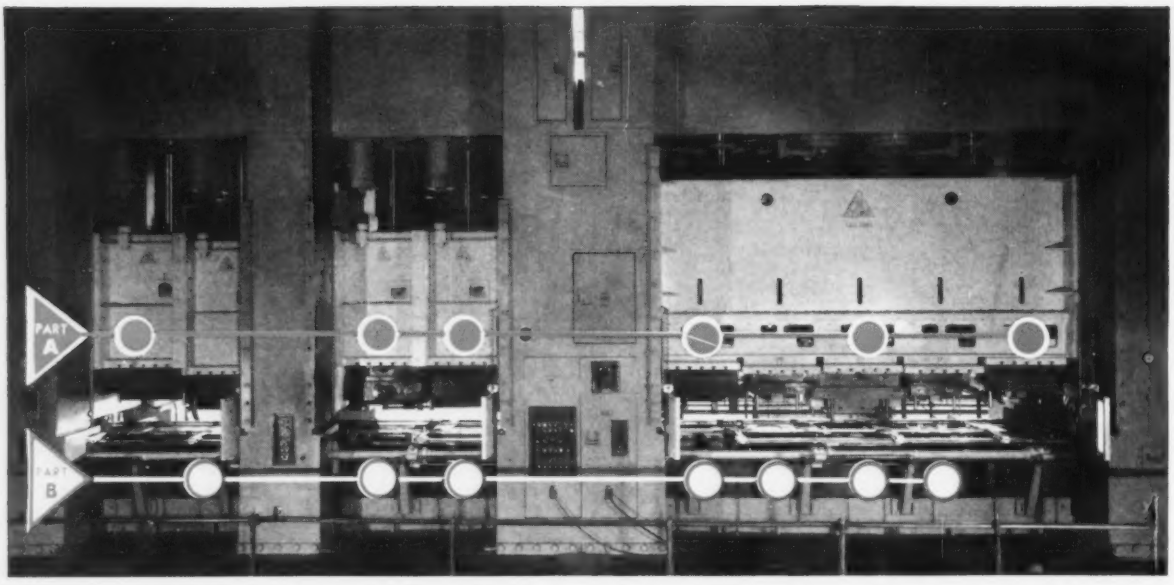
Appliance manufacturers on the West Coast do pretty well buying supplies in their back yard. They're good customers for the plate mills.

Ingenuity helped the southern California manufacturers to get off to a good start. They had to design and produce for a market with these characteristics: California climate, trend toward informal living, and basementless houses. And fresh designs, pushed by hot promotion, keep them in the national eye.

The Design Results — Recessed wall heaters. These answer the need for people who feel they don't need a complete central heating system; for the added room; and the concrete-slab house, office, and motel.

Built-in gas ranges, and their promotion as decorative, efficient kitchen space-savers.

Forced-air systems for central heating. And the concept of "perimeter heating" which puts heat into a house where the cold comes in—beneath glass areas and through the outside walls.



A Clearing modular press equipped with one large single slide and two pairs of split slides produces washer tops for several hours, then converts in minutes to producing dryer tops.

QUESTION: HOW CAN CLEARING TRANSFLEX SLIDE PRESSES HELP YOU BEAT THE COST SQUEEZE?

ANSWER: **BY PROVIDING A WHOLE NEW BAG OF TRICKS THAT WILL INCREASE YOUR PLANT'S PRODUCTIVITY.**

Q. **Does operating a Clearing multiple slide press present a major advantage over automating a number of individual presses?**

A. Individual presses will do the job. However, the main advantage with a single, multiple slide machine lies in greatly increased productive potential because it can operate continuously. Then too, there's the lower initial cost and lower operating costs of running a single machine—less manpower, less floor space required, less overhead.

Q. **Why multiple slides rather than a single large slide?**

A. Multiple slides make it possible to correct unbalanced loading—a more or less natural condition when trying to run a number of dies in a single press.

Q. **What are split slides?**

A. Split slides are actually two individual slide elements placed side by side between a common pair of uprights. They provide for unbalanced load conditions and facilitate almost instant production changeover by making it possible to adjust dies into, or out of, the operation.

Q. **What about skip stroke?**

A. Skip stroke enables a manufacturer to produce two parts at alternate strokes of the same machine. The slide has an internal mechanism which raises the punch at every second stroke so that parts passing through these stations are untouched. Split stroke combined with split slides makes a number of production combinations possible.

Q. **How about sub-slides?**

A. Sub slides are a good way to individually adjust dies on a single large slide. Sub-slides are another way to make quick production changes by manipulating slide adjustments.

Q. **Is there more detailed information available on Clearing Transflex slide arrangements?**

A. Just write us. We'll send our bulletin SB33.48 without delay.

CLEARING PRESSES THE WAY TO EFFICIENT MASS PRODUCTION

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Could You Produce Weapons?

Uncle Sam Wants To Know Just In Case

Defense Dept. spokesman tells gear makers the government wants to know who can make what weapon.

The reason: To avoid delay in mobilizing in case of war.

See Armed Forces Procurement Office to get on the list.— By E. J. Egan, Jr.

▪ In the event of war, the Government won't be able to play hide-and-seek with the metalworking industry. The dizzy pace of advancing technology allows no time for the World War II pastime: (1) industry descending on Washington to find out who bought what, and (2) military men fanning out over the country to see who made what.

"Military preparedness and industrial readiness are heads and tails on the same coin. They both must be geared to the ever-changing technology of this age."

So said J. Lewis Powell, member of the staff of the Assistant Secretary of Defense, at the 41st Annual Meeting of the American Gear Mfgrs'. Assn., Hot Springs, Va.

Must Know Who—"For sustained readiness," Mr. Powell continues, "the military must always know who can make what, how much he can make and how fast. Industry must always know what military agency wants what, how much and how soon."

This means mobilization planning—matching needs of specific, potential military customers to the facilities of potential producers. To prevent fumbling and delay the armed forces have devised a Production Allocation Program.

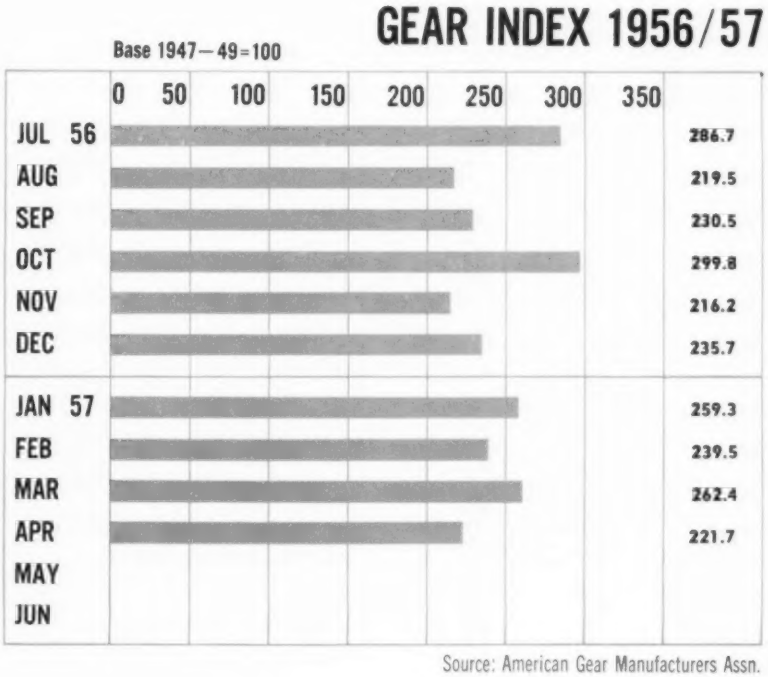
Weapons Only — According to Mr. Powell, this program is concerned only with direct defense requirements—weapons only.

The Defense Dept. Register of Planned Mobilization Producers lists about 21,000 plants interested in planning for wartime production. Mr. Powell extended gear makers, and other essential manufacturers, a wide-open invitation to get on this list by contacting the nearest military procurement office.

Why We Should Plan—Flexibility is the keynote of the Production Allocation program, Mr. Powell declared. He admitted there are three principal arguments against the need for mobilization planning. One implies there is no need to plan for a quick war. Mr. Powell's reply: "In event of violent war, victory may well go to the side which can first stagger back to its feet and deliver the second blow."

Another argument protests that we didn't use all our plans for World War II or Korea. The speaker said, "This is the logic which says we didn't use all of our fire plugs in the last two fires, so why have fire plugs?"

Be Specific — Another segment protests the need for planning unless exact-quantity needs can be specified for tanks, planes, ships and weapons of all kinds. Mr. Powell's answer: "This is the logic which says fire plugs are wonderful but don't install them until you know how much water it takes to put out a fire of unknown origin at an unknown time in an undetermined location."



Source: American Gear Manufacturers Assn.

INDUSTRIAL BRIEFS

Books Balance?—W. R. Davies, director of the Audit Div. of U. S. Steel Corp., was elected president of the Institute of Internal Auditors. The Institute has 3,700 members, representing 2,000 business enterprises throughout the world.

No Flies—U. S. Steel's Cyclone Fence Dept. will begin producing fiberglas insect screen cloth at the Greensburg, Ind., plant. Cyclone Fence, will begin full scale production of insect screening from fiberglas material in order to supplement its line of bronze, aluminum and galvanized products. The Greensburg plant will be equipped with special looms and ovens which will weave and finish the material.

Test Run—New contracts for the production of more than $1.7 million in guided missile testing equipment are being awarded the Electronics Div. of Kaiser Aircraft & Electronics Corp., Toledo, O. The test equipment allows technicians to make an automatic ground check of the operating characteristics of a missile before firing.

Danish Reactor—The Babcock & Wilcox Co. has signed a contract with the Danish Atomic Energy Commission to make nuclear fuel elements for a tank-type research reactor the AEC is now building in Denmark. Contract calls for 45 field element assemblies, 33 standard units and 12 with provisions for controls. They will be fabricated from uranium enriched to 20 pct of the U-235 isotope.

Super Steam—A large order for seamless tubing made from a super alloy stainless steel has been received by The Timken Roller Bearing Co.'s Steel & Tube Div. from Combustion Engineering, Inc. The stainless tubing will be used for superheater tubes in the hottest sections of a new steam generator to be installed at Eddystone, Pa., for the Philadelphia Electric Co.

Cap and Gown—J. R. Newell, president of the Bath Iron Works Corp., Bath, Me., has been awarded an honorary Doctor of Engineering degree at the commencement exercises of Stevens Institute of Technology. Mr. Newell, who has been president of the corporation since 1950, will be cited for his outstanding contributions to the field of shipbuilding.

Big Things from Harvey—Harvey Aluminum Co. is now in full production on a forging press unparalleled in the aluminum industry —a 4000-ton hydraulic unit with side rams. In operation at the Torrance, Calif., plant, the installed press makes it possible for Harvey to produce complex aluminum shapes and parts incorporating under-cuts or back-drafts.

Southern Front—The Aluminum Div. of Olin Mathieson Chemical Corp. has opened a district sales office in Atlanta, Ga., for Olin Aluminum. The office will be the sales headquarters for Olin Aluminum in Alabama, Florida, Georgia, N. Carolina, S. Carolina and eastern Tennessee.

Rest for the Right Arm—J. J. Garvey has retired after more than 38 years service with the U. S. Steel Corp. For 22 years he was executive secretary to B. F. Fairless as the latter moved up from president of Carnegie-Illinois Steel Corp. to president of U. S. Steel and finally to Chairman of the Board. Mr. Garvey was also associated with the late William Irvin when he was president of U. S. Steel Corp.

Locker Room—Hayes Aircraft Corp., Birmingham, Ala., has branched out into non-military manufacturing. It will manufacture steel lockers for schools, factories, hospitals, clubs, etc. The plant will have a capacity of 5,000 lockers per month. To distribute the lockers, a new corporation has been formed, Southland Metals.

Make Reservations—The American Society of Tool Engineers will hold its 1958 tool show in Philadelphia's Convention Hall, which last hosted the event in 1954. The show is scheduled for May 1-8, from 9:00—6:00 p.m. A complete integrated technical program of papers, panels, siminars, plant tours and related activities will be offered.

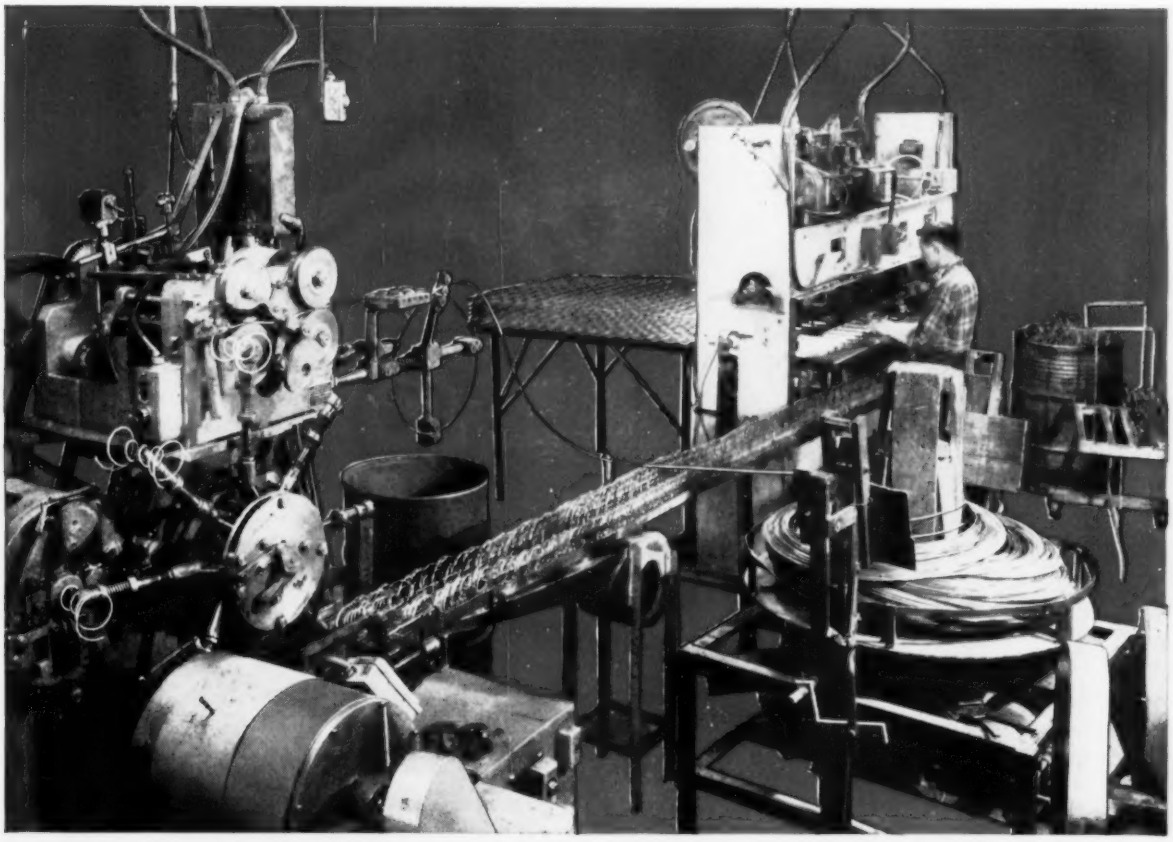
Basic Strategy—Basic Inc. has completed its Distribution Center to facilitate the supply of basic refractories to steel furnaces in the Chicago area. Tiger Brands Inc., Basic's sales subsidiary for building materials, is now at its Hammond, Ind., address.

Electronic Brain Power—Datamatic Corp., Boston, manufacturer of large-scale electronic data-processing systems, will expand its production facilities. The firm will enlarge its electronic brain systems of the $2 million to $2¼ million class.

Pacific Power — Residents and industries of the Manila area in the Philippine Islands will have 25,000 kw of additional power in 1959. It will be generated with General Electric steam turbines, recently ordered by the Manila Electric Co. for shipment in 1958.

"I don't suppose you'd be willing to settle for a raise, Barnes?"

Double cone springs are produced automatically on this Wunderlich special high speed automatic coiling and knotting machine at the Sealy Mattress Company, Cleveland, Ohio. Machine coils, crimps, knots and heat treats springs made from 13½ gage Mastercraft spring wire, supplied in 600 lb. bundles.



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J&L spring wire reduces number of rejects, increases production, in modern automatic operations. One reason is that every bundle of spring wire is produced to closely controlled tolerances.

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Try this superior Jones & Laughlin spring wire. You'll find it's tops in quality, competitive in price.

Call your J&L representative or write to the Jones & Laughlin Steel Corporation, Dept. 403, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

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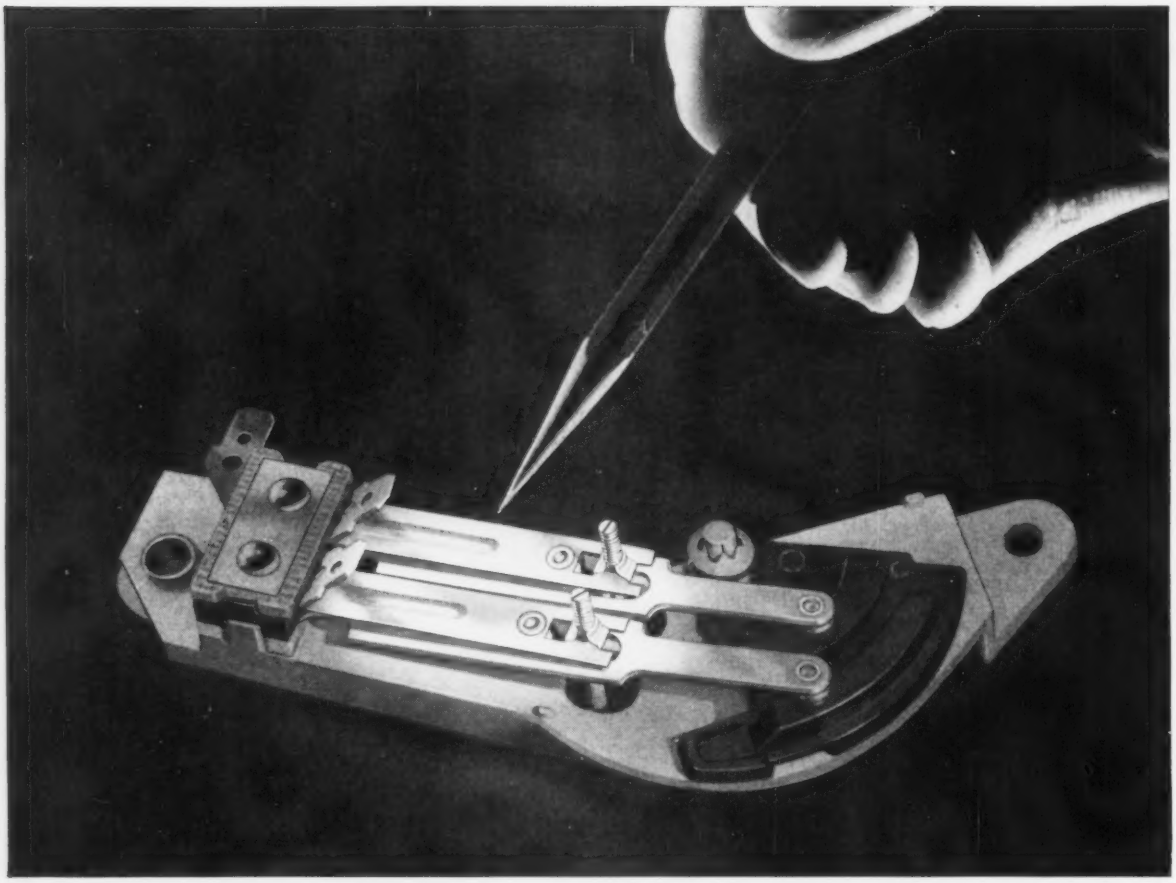

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ONE SPEED CLIP® REPLACES 3 PARTS... SIMPLIFIES ASSEMBLY... and saves money!

General Electric's Housewares & Radio Receiver Division, Bridgeport, Connecticut, adopted this one-piece, multiple purpose SPEED CLIP and made profitable savings in the new G-E Automatic Coffee Maker.

Engineered by Tinnerman specially for the thermostat control, each SPEED CLIP replaces three parts—a blade, a bushing, and a lock nut. Controls are now assembled faster, easier, with improved line flow. There are fewer parts to buy, stock and handle... and unit cost has been reduced, too.

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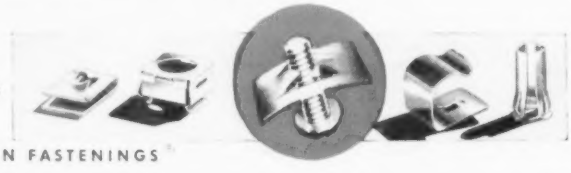

Eugene Caldwell, elected president, Baker-Raulang Co., Cleveland.

H. F. van der Laan, elected president, Vitro Rare Metals Co., Canonsburg, Pa., Div. of Vitro Corp. of America.

W. H. Welch and **R. S. Russell,** elected president and vice president, production, Sleeper & Hartley, Inc.

A. I. Stayman, named president, American Nut & Bolt Fastener Co. of Pittsburgh.

A. L. Pontius, elected vice president, Illinois Tool Works, Chicago.

S. S. Wilson, appointed executive vice president and general sales manager, Sel-Rex Corp., Nutley, N. J.

W. A. Cook, elected vice president, Barium Steel Corp; **J. A. K. Sisto,** elected vice president; **Daniel Eberstein,** named secretary; **I. M. Smith,** named treasurer.

J. A. Sisto, will serve as president and chairman of the board, Barium Steel Corp.

W. J. Haeger, appointed vice president, Abell-Howe Co., Chicago.

P. H. Richey, appointed vice president, finance, Wagner Bros. Inc.

Franc Kobola, promoted to vice president, Globe Dismantling Corp., Glassport, Pa.; **J. T. McCarthy,** promoted to controller and asst. to the vice president.

F. M. Stefan, appointed executive vice president, Marbon Chemical Div., Borg-Warner Corp.

H. E. Morison, appointed vice president, Ingersoll Steel Div., Borg-Warner Corp., Chicago.

H. E. Pape, elected executive vice president, The Stanley Works, New Britain, Conn; **C. J. Diemand,** elected vice president, Stanley Steel Div; **M. D. Coe,** appointed director of purchases.

Dr. W. A. Dean, named asst. development metallurgist, Aluminum Co. of America, Pittsburgh.

J. J. Hopper, appointed asst. general superintendent, Ellwood Works, National Tube Div., U. S. Steel Corp.

R. J. Frysinger, appointed credit manager, American Bridge Div., U. S. Steel Corp.

L. J. Coslov, president, Tube City Iron & Metal Co., was named executive vice president, Globe Dismantling Corp., Glassport, Pa.

Mord Lewis, elected executive vice president and director, Anaconda Aluminum Co., New York.

J. O. Zimmerman, elected executive vice president, financial staff, General Motors Acceptance Corp., New York.

F. I. Courtney, elected executive vice president, Virginia Metal Products, Inc., Orange, Va.

C. J. Ryan, appointed asst. to the vice president, sales, Crucible Steel

Co. of America, Detroit; **M. J. Dempsey,** appointed manager, Detroit sales branch.

C. N. Reeves, appointed asst. vice president, Sales Div., Wheeling Steel Corp., Wheeling, W. Va.

R. H. Tucker, elected secretary, Minnesota Mining & Mfg. Co., St. Paul, Minn.; **I. R. Hansen,** elected treasurer.

H. E. Redenbaugh, named manager, International Div., Mine Safety Appliances Co., Pittsburgh.

G. R. White, appointed asst. district manager, New York sales district, Kaiser Aluminum & Chemical Sales, Inc.

E. E. Olson, appointed sales director, Shallway International Corp., Palo Alto, Calif.

Marvin Marcus, appointed sales manager, government operations, Lummus Co.

J. J. Kiegel, appointed asst. chief engineer, Rolling Mill Div., E. W. Bliss Co., Salem, O.

POPE *engineers and builds*

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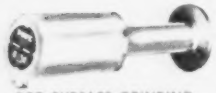
SPINDLES

one of which may be just the one to LOWER YOUR PRODUCTION COST

Here are only a few representative Pope Precision Spindles:



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D. W. Dewey, appointed sales manager, Truck-Man Div., Knickerbocker Co., Jackson, Mich.

J. H. Froelich, appointed manager, production control, Universal-Cyclops Steel Corp., Bridgeville, Pa.

Russell Dupuis, named manufacturing manager, Machinery Hydraulics Div., Vickers, Inc., Detroit.

R. T. Baureithel, appointed district sales manager, Philadelphia sales office, The Beryllium Corp., Reading, Pa.

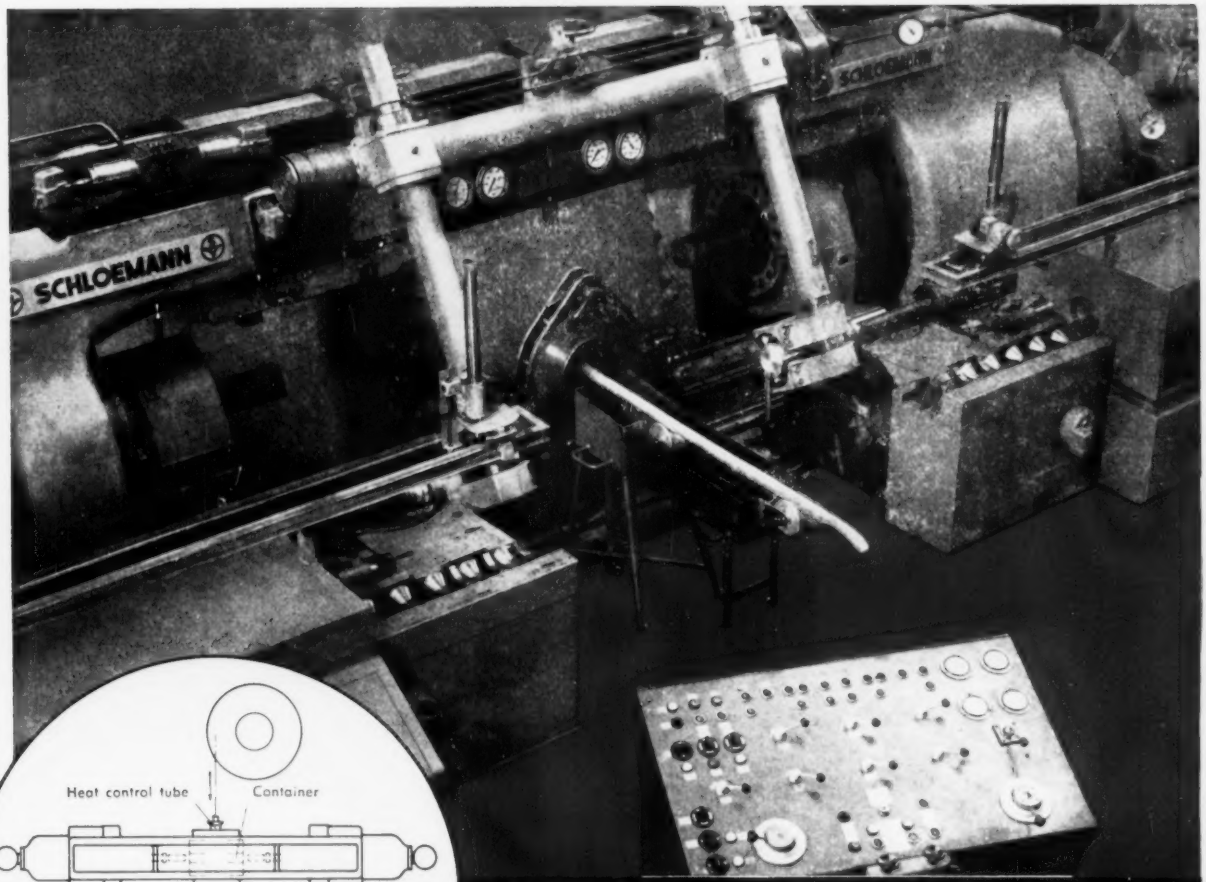
D. R. Wickman, appointed manager, motive power sales, Industrial Div., Gould-National Batteries, Inc., Trenton, N. J.

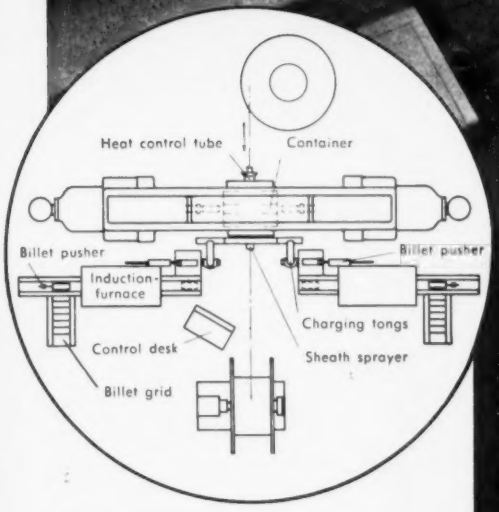
Lewis Curtis, appointed director of sales, The Tennessee Fabricating Co., Memphis.

Dr. L. A. Carapella, named technical director, Jessop Steel Co.

SCHLOEMANN

Aluminum Cable Sheathing Press





This 1760 ton unit, FIRST of several to be erected in the United States, is now being installed at a plant of GENERAL CABLE CORPORATION.

Unique advantages may be attained with this small unit

Cable of any desired length can be sheathed, up to 2⅜ in. or 4 in. o. d. respectively · High efficiency, as two solid billets are extruded against each other with low power requirements · Direct self-contained oil-hydraulic pump drive for the extrusion, combined with accumulator for shortening the dead periods · Simple and quick automatic operational sequence · Smooth, perfectly welded cable sheaths with a uniform grain structure · Effective heat protection of the cable core insulation · Economical production even of very thin-walled tubes, and of sections and wire

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and subsidiaries, Washington, Pa.; **E. I. Ghrist,** was promoted to general superintendent.

S. F. Long, named manager, Chicago district sales office, Silicone Products Dept., General Electric Co., Waterford, N. Y.

H. O. Howard, appointed district manager, Cleveland district sales office, Revere Copper & Brass Inc., Detroit.

R. C. Spooner, appointed district manager, Milwaukee district sales office, Revere Copper & Brass Inc., Chicago.

J. A. McCullough, named manager, electronic business machines sales, International Div., Burroughs Corp., Detroit.

F. P. Halas, appointed Midwest regional sales manager, Norden-Ketay Corp.

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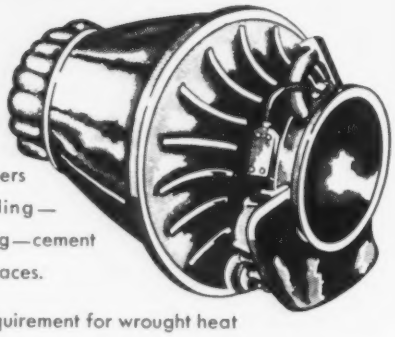

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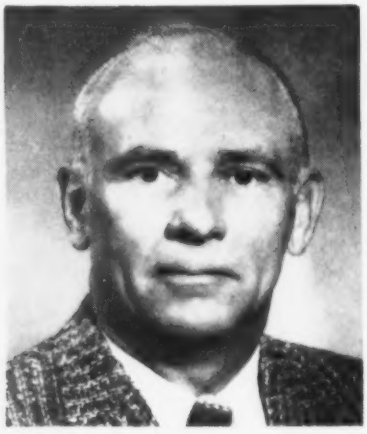
R. E. Mitchell, appointed administrative assistant, industrial engineering, Central Industrial Relations Dept. staff, Eaton Mfg. Co., Cleveland.



W. F. Blackney, named factory manager, Formed Tubes, Inc., Sturgis, Mich.

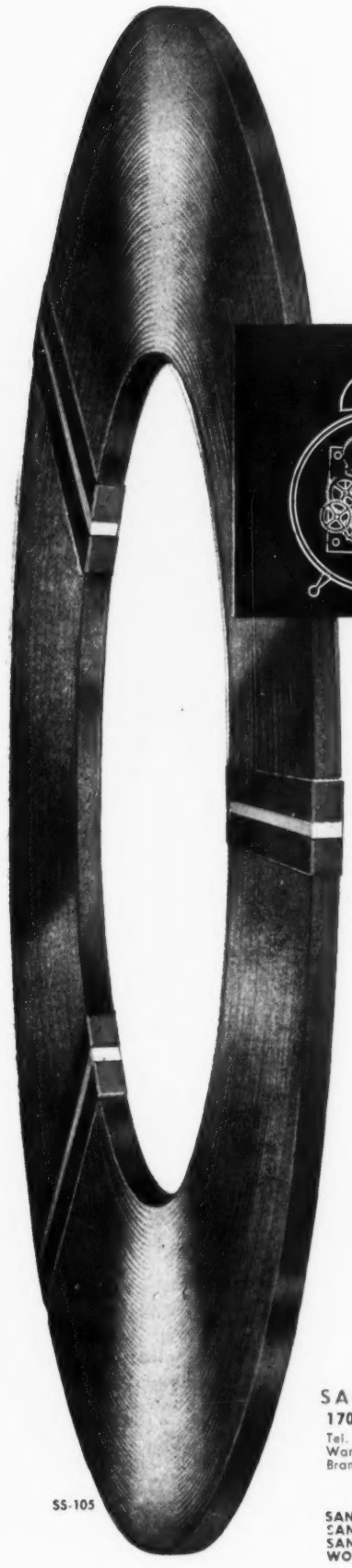
H. B. Chambers, appointed director, metallurgy, Atlas Steels Ltd., Welland, Ont.

J. W. Caswell, appointed Southeastern representative, Socket Screw Div., The Bristol Co., Waterbury, Conn.

R. H. Benton, appointed sales engineer, New Orleans district, Inland Steel Products Co.

H. L. Misch, named asst. chief engineer, product engineering office, Mercury Div., Ford Motor Co.

C. A. Lilly, Jr., appointed manager, marketing, Large Steam Turbine-Generator Dept., General Electric Co., Schenectady, N. Y.; **R. S. Neblett,** named manager,



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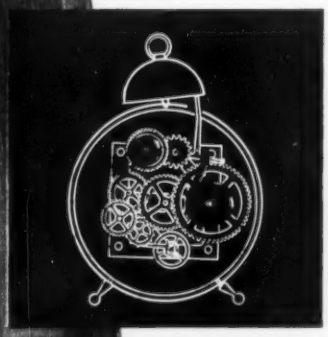

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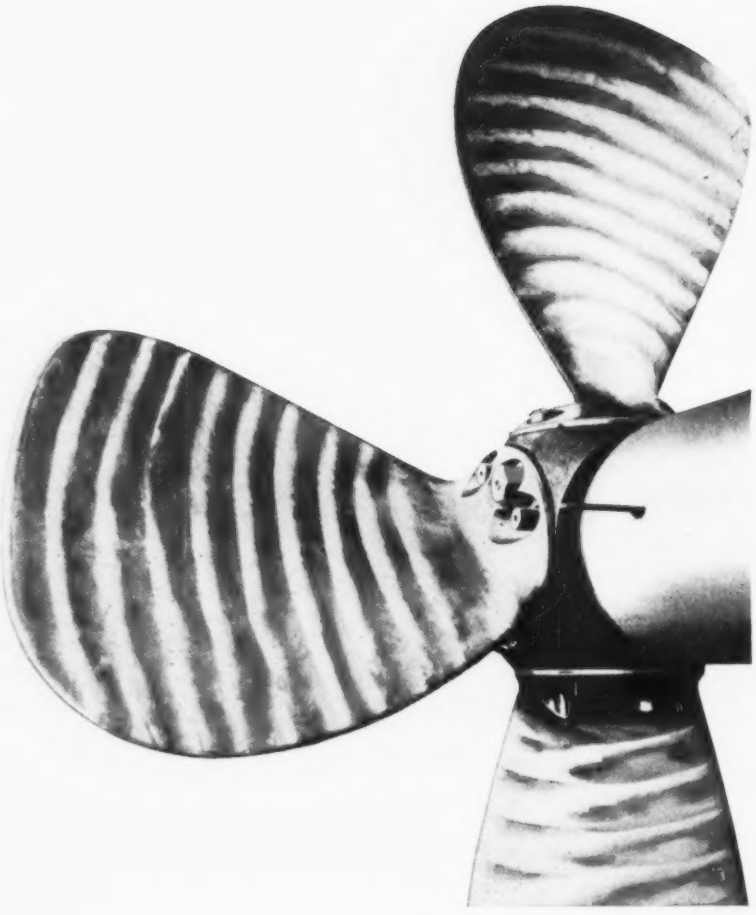

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J. B. McBride, appointed asst. district sales manager, Chicago district, Republic Steel Corp.

S. O. Drivdahl, appointed regional sales manager, General Mfg. Div. and Forging & Screw Machine Div., Scovill Mfg. Co., Waterbury, Conn.

C. C. Earle, appointed sales manager, Buffalo plant, Joseph T. Ryerson & Son, Inc.

E. R. Reed, appointed California district sales and service engineer, Grinding Machine Div., Norton Co., Worcester, Mass.

T. W. Kelly, has been promoted to asst. sales manager, Western district, The Lamson & Sessions

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1" to 2"	11 thru 20	
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Carbon 1010 to 1025

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Tube Diameter O.D. Size	Maximum Wall Decimal	BWG Gauge	Minimum Wall Decimal	BWG Gauge
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⅙	.083	14	.022	24
¼	.095	13	.022	24
⅝	.095	13	.022	24
¾	.095	13	.028	22
⅞	.095	13	.028	22
1	.095	13	.028	22
1⅛	.095	13	.028	22
1¼	.095	13	.035	20
1⅜	.095	13	.035	20
1½	.120	11	.035	20
1⅝	.120	11	.035	20
1¾	.120	7	.035	20
1⅞	.180	7	.035	20
2	.180	7	.035	20
2⅛	.180	7	.035	20
2¼	.180	7	.035	20
2⅜	.180	7	.035	20
2½	.180	7	.035	20
2⅝	.180	7	.035	20
2¾	.180	7	.035	19
2⅞	.180	7	.042	19
3	.180	7	.042	19
3⅛	.180	7	.042	19
3¼	.180	7	.042	18
3⅜	.180	7	.049	18
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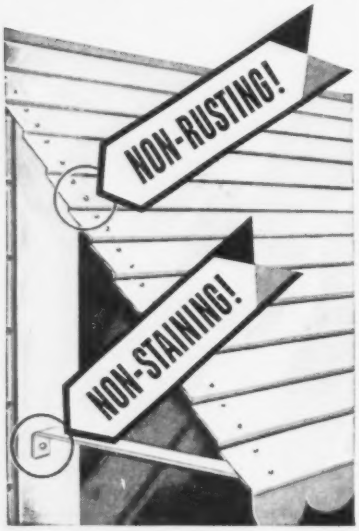

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W. J. Newton, appointed engineering representative, New England region, Huck Mfg. Co., Detroit.

R. L. Williams, promoted to asst. chief engineer, Automotive Div., The Timken Roller Bearing Co.

R. L. Daniels, named chief engineer, Formsprag Co.

B. W. Moylan, appointed sales engineering representative, Hydraulics Products Div., Brown & Sharpe Mfg. Co., Providence, R. I.

R. N. Kendall, appointed vice president, Colonial Broach & Machine Co., Detroit.

J. H. Reynolds, appointed manager, foreign installations, turbines section, Installation & Service Engineering Dept., Apparatus Sales Div., General Electric Co.

H. M. Cragg, appointed St. Paul district manager, Industrial Div., Gould-National Batteries, Inc., Trenton, N. J.

A. T. Mortrud, appointed manager, Arc Welding Div., The Burdett Oxygen Co., Cleveland.

W. L. Ashlock, has been promoted to regional sales manager, Detroit, Western Brass Mills Div., Olin Mathieson Chemical Corp.

Lou Tuglus, named asst. sales manager, Clearing Machine Corp.

R. J. Warren, has joined the sales staff, Chicago office, L. B. Foster Co.

F. J. Gibbons, elected treasurer, and **A. E. Toy,** elected controller, Calumet & Hecla, Inc., Chicago.

Harold Hoekleman, appointed manager, Chicago district, Youngstown Sheet & Tube Co., Youngstown, O.

C. M. Allen, appointed southeastern area representative, Industrial Products Div., The Pioneer Rubber Co., Willard, O.

H. W. Eveslage, appointed general sales manager, Morrison-Drabner Steel Co., Cincinnati.

R. C. Galbraith, named director, financial operations, Lockheed Aircraft Corp.'s Calfornia Div., Burbank, Calif.

J. R. Onders, named sales engineer, Pittsburgh, Wall Colomony Corp.

OBITUARIES

A. W. Schede, 68, president, The Belmont Iron Works, Philadelphia.

J. B. Armitage, 76, vice president, Kearney & Trecker Corp.

A. A. Ohmer, manager, forging sales, Erie Forge & Steel Corp., Erie, Pa.

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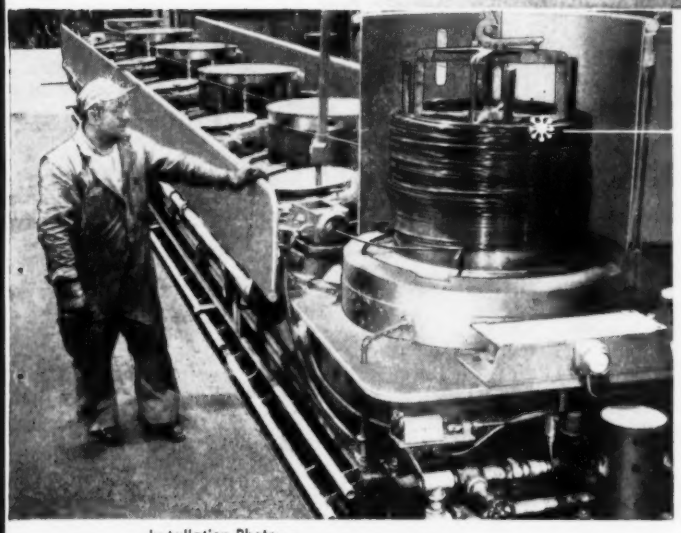

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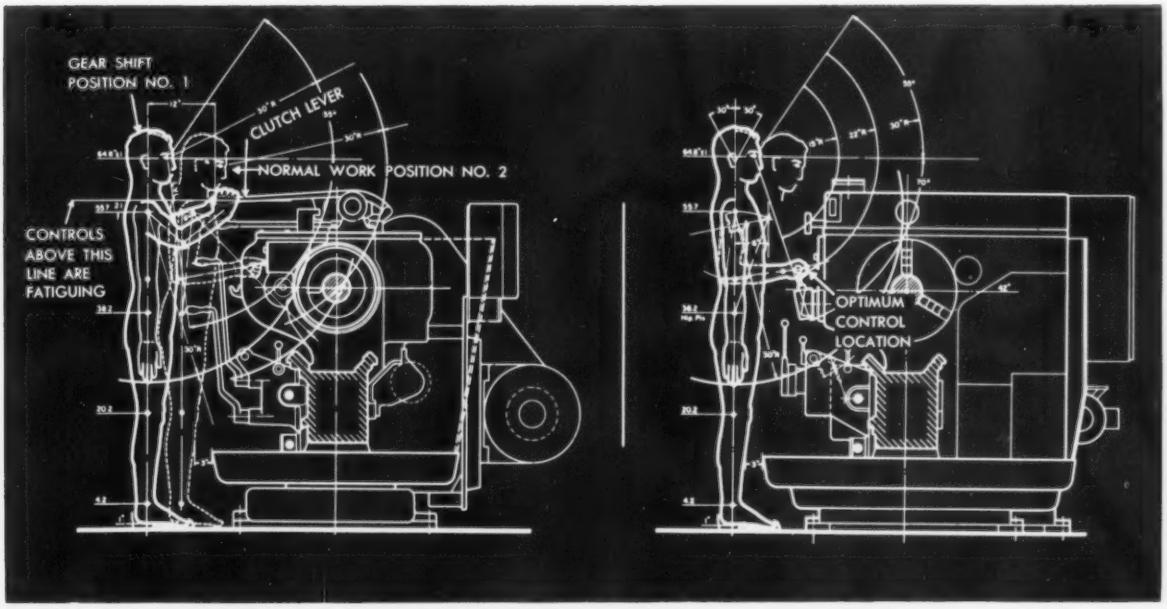
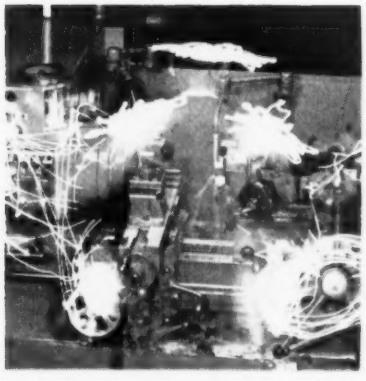

GEAR SHIFT POSITION NO. 1
CLUTCH LEVER
NORMAL WORK POSITION NO. 2
CONTROLS ABOVE THIS LINE ARE FATIGUING
OPTIMUM CONTROL LOCATION

ARM SWING: Shifting on new machine, right, takes place at more natural height than on older machine, left.

Ergonomics: A Human Guide To Machine Design

By **E. C. Beaudet**—Managing Editor



MOTION: Lights affixed to operator trace his movements during turning cycle on turret lathe. Circular traces show major control areas.

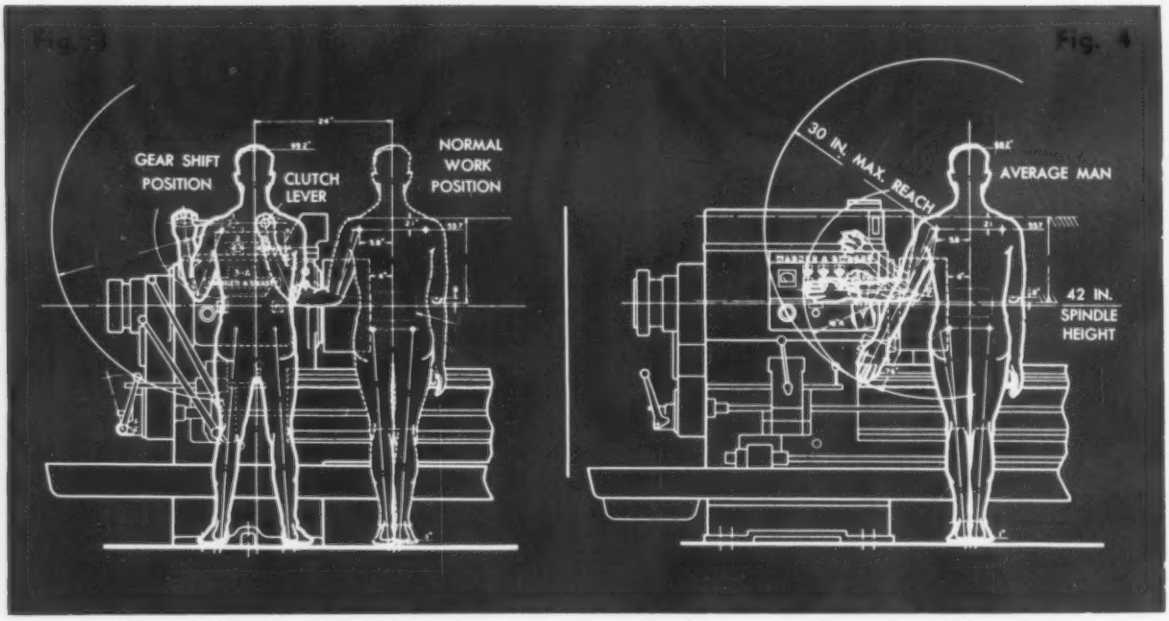
Excessive operator fatigue cuts output, lowers morale and boosts grievances.

But what causes it? That's what ergonomics tries to find out. It studies man at work and strives to come up with designs better-suited to the operator.

▪ One of the signs of a well-designed machine tool is its ease of operation. No matter how many pieces a tool can turn out its design falls short if the operator is not happy running it.

Ergonomics is a science which deals with just such problems. It studies man at work and how he reacts in all kinds of man-machine situations. It considers the mental as well as the physical needs of the worker in relation to his job.

Fatigue Problems—Take fatigue for example. It's only common sense that an operator who tires easily will produce less. Not only that but his morale drops; minor irritations become major; grievances mount over working conditions; and hassles develop about job rates. And the saddest part is that many times neither the operator nor management can put a finger on it.



BODY POSITION: Sideways movement was needed to shift gears on old machine, left. None is needed now.

This is where ergonomics comes into play. By carefully studying physical dimensions and other characteristics of human beings, standards can be set up governing limits of reach, vision, bending, standing, lifting, turning, etc. When these are taken into account, machine design can go a long way in cutting fatigue and improving operator comfort.

Human Factors—Of course, no designer worth his salt overlooks the human factor in designing machine tools. If he did he wouldn't be around very long. In many cases, however, these considerations are based on the experience of designers, engineers and tool-troublemen in the builder company—and the personal reactions they get from operators of their equipment in the field.

Motion Studies Tell the Ergonomics Story

The link charts above are motion studies made at the control panels of the old and new 3A turret lathe designs. Solid lines are left hand moves and the dotted lines right hand moves.

Normally, before starting up, an operator visually checks the lathe to see that the clutch is in neutral. He then pushes the starting button. After a motor check he will then check the spindle operation by shifting the clutch left for forward running. Next comes the selection of a speed for the initial cut.

Complete Cycle — Both link charts show the most number of moves in this operation. On the old design the operator had to move the clutch into "neutral" before making a speed change. After selecting a speed, the operator again moves the clutch to the forward running position. This ends the cycle shown in the chart.

When making shifts for a speed change on the old lathe, the levers have to be jiggled to make the gears mesh. This is shown by the wiggly lines on the chart.

Smoother Action—On the new design, the hand lever is pushed in for shift without the need for moving into neutral. It will then automatically kick out and the spindle will be running at the new speed. While the cut is in progress, the preselector knob may be turned for the next speed.

The link charts show that 16 moves, with two body positions and both hands, are needed on the old design; compared with 8 moves, left hand only, on the new one.

The hand movements on the new lathe are short, effective, harmonius and smooth. Back tracking, repeated movements and waste motions are avoided. Controls used more frequently are the most accessible.

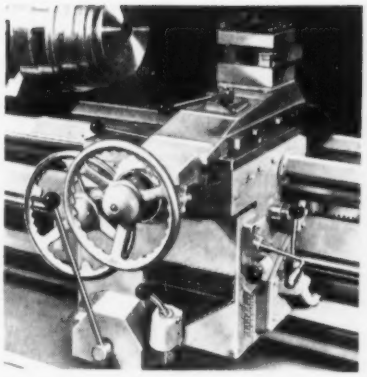
Note that the forward, neutral, brake and reverse positions are similar on both lathes. Standardization must be taken into account if people are used to it, particularly when operators are transferred from one machine to another.

There's no question that many good machine tools are designed in this fashion. But Warner & Swasey Co., Cleveland, takes its own machine tool know-how a step farther. By using ergonomic principles the company scientifically pins down troublesome work areas and tries to overcome them.

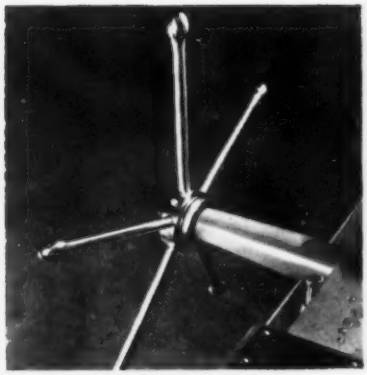
Working Statistics — Working with Warner & Swasey on this project is the Henry Dreyfuss design organization in New York City. Drawing from many studies made by the Armed Services, medical and scientific organizations, the design firm has come up with dimensions covering 95 pct of the people studied. The upper and lower 2.5 pct are excluded from the studies for practical purposes.

The average weight for these thousands of men is 153.1 lb, ranging from 118 to 202 lb. In height, the average man is 5 ft 9.2 in. The upper limit is 6 ft 2.5 in. and the lower 5ft. 3.7 in. in the 2.5 to 97.5 pct range. Many other statistics and information about the human characteristics are also used in applying ergonomic principles.

Having the statistics on hand is one thing, but applying them is another. At best these statistics are used only as a guide. The designer must adapt them to the problem involved. In one situation it might be best to take the upper limits of height or reach. In another case the lower limit may be the critical factor.



EASY REACH: All operating levers in three main control levers are within easy reaching distance of normal operating position.

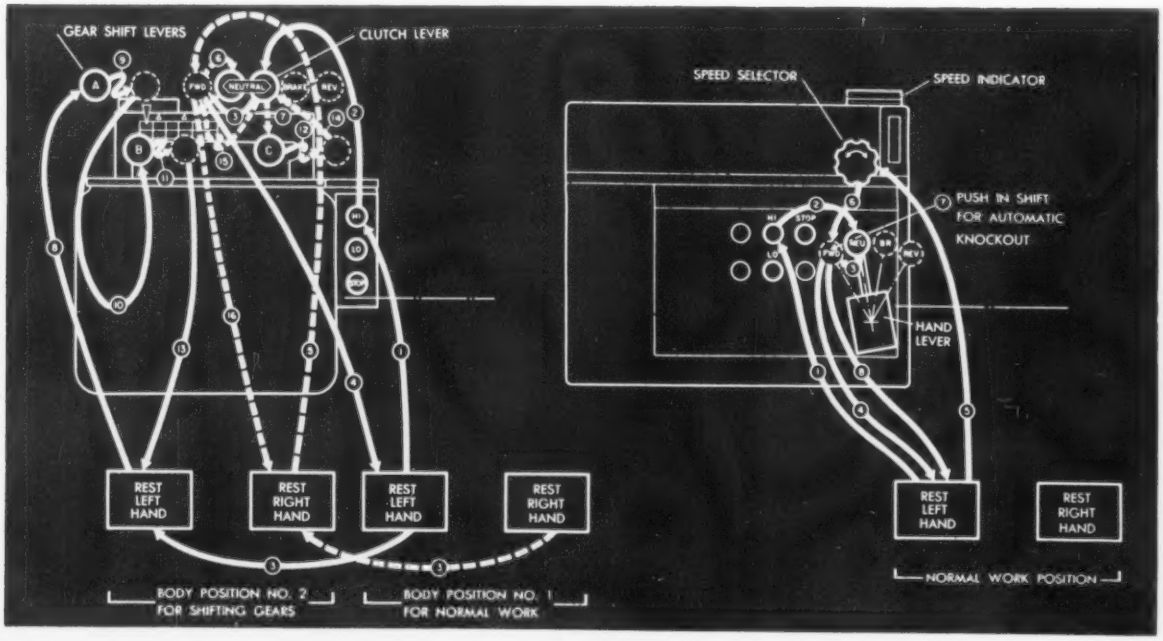


"HOT HANDLE": A five, rather than four-spoke turnstile gives the best average position for the "hot" handle on most jobs.

Case Study—Let's see how Warner & Swasey engineers and the Dreyfuss group redesigned its 3A turret lathe. Ergonomics was applied to two main areas:

1. Manual Controls — These were studied for their location, organization, and handling ease as determined by human limitations of reach, muscular strength, natural limb motion, speed of action, hand grip characteristics, fatigue—and some mental factors such as memory and habit.

2. Speed Selection and Indication—Here position, organization, type of information and legibility



Dimensions of large and small men are taken into account so machine is comfortable for about 95 pct of operators . . .

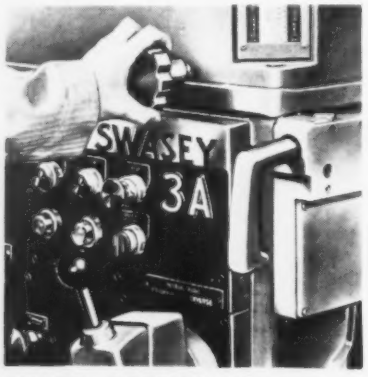
needs were studied in relation to optical height, form and color, maximum reading distance, eye motions, head motions and color contrast.

The drawings on earlier pages show the "average" man placed in tailstock and cross-slide views at both the new turret lathe and an exceptionally old-style lathe chosen for good contrast.

Actually, the studies were much more complicated and were based on far more than average statistics. Dimensions of both the large and small man were taken into account so that the machine would feel comfortable for about 95 pct of all operators.

Height Limits — For example, the best height for a control or work area falls between the shoulder and the elbow. Here the height limit of the "small" man is more desirable since these areas involve mainly forearm motions. Raising the upper arm means lifting more weight, resulting in higher fatigue.

Thus the small man is the determining factor in this zone and the optimum work height falls between 54 in. and 40 in. The choice then of a 42-in. spindle height is ideal.



SHAPE CODING: Handles are shaped differently to prevent confusion. Some are ball-shaped, others cylindrical.

The same reasoning applies to the location of the master control lever, put between 45 in. and 46 in. above the floor level.

There is also an ideal shifting height using a natural arm swing, Fig. 2; as against raising the upper arm to shifting on the old design, Fig. 1.

Better Grip — Ergonomics was also used to develop the master control lever. This lever now has a ball grip which forms a ball and socket joint in the hand and operates smoothly in all directions.

Combined with the speed preselector knob above it, the master-control lever replaces one clutch lever and three gear shift levers on the old design. The three gear shift levers are a little high and not compatible with natural arm motions. Also, the location of their cylindrical-type grips causes excessive angling of the wrist joint.

One of the greatest improvements in the 3A lathe is the simplified body positioning during normal operation and speed shifting, Figs. 2 and 4. On the old design the operator must move sideways at least 2 ft to shift gears, Fig. 3, as well as step backward, Fig. 1.

Less Swing—Secondary controls on the new lathe have also been relocated and redesigned with less swing. The operator has only to move his trunk a comfortable 6 in. in all directions to handle controls within his convenient reach. On the old design the body movement required was several feet.

The main control panel is painted dark gray since this color increases the light contrast with signal lights.

Speed indication on the new turret lathe consists of a direct-reading preselector dial, calibrated in surface feet and spindle rpm's. For easier reading it is placed normal to the line of sight by angling about 45 degrees to the cross slide.

Cut Reading Errors—The height of this indicator falls within 30 degrees below the horizontal sight line. This is the most relaxing reading position and causes fewer reading errors. Its distance from the operator's eyes is within an ideal reading range of 15 to 22 in.

Aside from location, many other factors entered into the indicator design. These include: compactness to minimize scanning; letter styling and color coding.

Safety and maintenance factors also go hand in hand with good ergonomic principles. In the redesign of the 3A turret lathe operators are protected from crushed fingers by gaps not less than 1.5 in. between moving and closing parts. Emergency controls are in clear areas, easy to reach and color coded. Sharp edges and corners are softened.

Use Power—Other broad areas where Warner & Swasey has used ergonomics are in the individual design of machines for each range of work, and the use of power-operated units wherever needed.

One-piece heads and vee-way beds, properly offset on the coolant pan, and individually designed for the work range permit the operator to stand close to the work. This cuts down the strain of tool positioning and gaging.

Wherever large masses must be moved frequently, power is applied. Examples of this are powered bar feeds and collet chucks and powered rapid traverse for cross slides and hex turrets.

Special attention has been given to the sensitivity and response of the rapid traverse design so that the operator may safely traverse, under power, close to the work.

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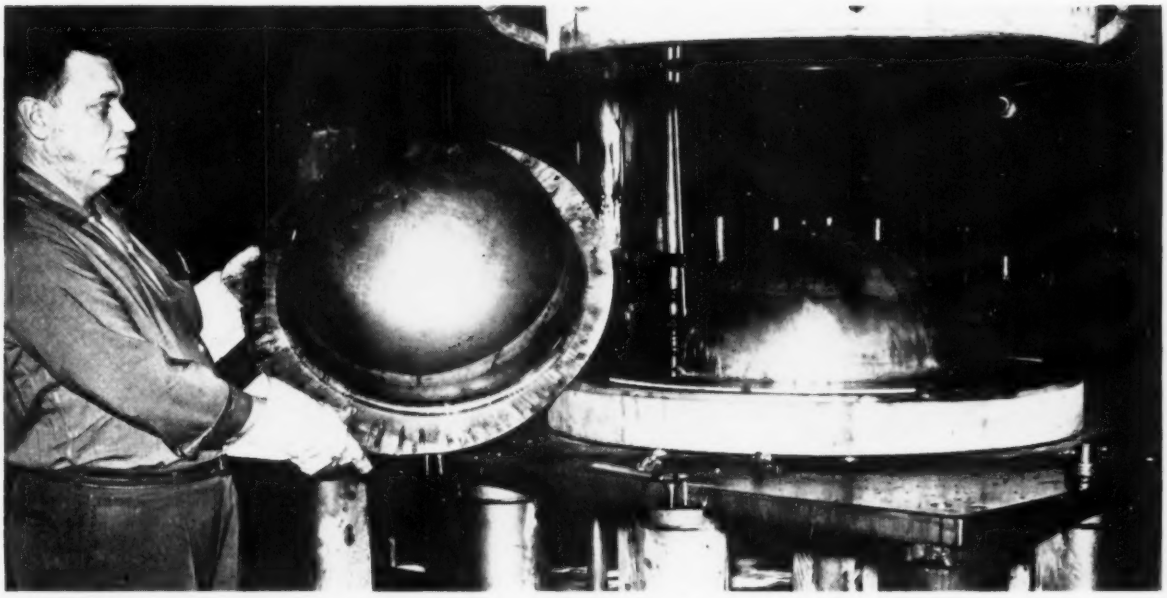


DISPERSION PLAYS ROLE: Graphite film prevents galling and scoring in deep-drawing of magnesium sheet.

Colloid Lubricant Eases Machining of Magnesium

Scientific research often calls for equipment and techniques never used before. Other times it requires something just a little better than the usual.

So it is in making the earth satellite. Severe forming of the magnesium takes extra care to get the smooth surface needed.

■ The earth satellite to be launched soon as a feature event of the International Geophysical Year has brought out new techniques in fabrication. When completed and launched, it will be a highly polished magnesium sphere, measuring 20 in. in diam and weighing 21½ lb., including electronic instruments.

The magnesium shell for the first of these globe circling satellites has been completed by Brooks and Perkins, Inc., Detroit, for the U. S. Naval Research Laboratory. Ten or more shells will be built in all, some for testing and some for actual launching.

Problem To Solve—Because of the thinness of the sheet and the severe heat and pressure involved, you have to find a way to prevent cracks, breaks and other defects in the magnesium shell during deep-drawing and spinning.

The answer is in colloidal graphite dispersion. Acheson Colloids Co., Port Huron, Mich., supplies 'dag' 41, a dispersion in lactol spirits.

Serving as a lubricant and parting agent, 'dag' 41 prevents galling and scoring. You get no metal pick-up on die surfaces to destroy close tolerances.

Tough Graphite — You spray 'dag' 41 on the 32-in. diam sheet blank of AZ31B magnesium alloy (0.090 in. thick). The naphtha carrier evaporates, leaving a tough, thin graphite film.

Before drawing, you preheat the sheet to a temperature of 600° to 650°F. A 750-ton press deep draws the sheet into a hemisphere.

Hot spinning is the next step to get exact dimensions required. You spin on a lathe with the shell torch-heated to 600° to 650°F.

Before placing the hemisphere on the cast iron spin block, you spray both the inside surface of the shell and the spin block with 'dag' 41. After applying heat and pressure to get final shape, you can remove the shell without damage.

Following the welding of a spun magnesium band inside the shell, you go through a final machining to get skin thickness of 0.028 in. Here again you apply 'dag' 41 to the form block on lathe to facilitate removal after machining.

Modernization: How Much Makes

By W. Czygan—Materials Editor

One of the weightier problems facing management today is when to modernize — and how much.

There aren't any hard and fast rules, but you'll find plenty of clues in the experiences of other people.

Compare your philosophies with those past and present of this firm.

▪ There's more to modernization than just refurbishing a plant and buying new equipment. To get the most out of this kind of program it has to become a continuing way of life.

Nor is half the job likely to be much better than none. The big payoff comes when management learns to stand off objectively and paint with a broad brush. Details are important, but should be delegated.

A good modernization plan will take in attitudes as well as assets. It'll consider everything—from the impression people get at the reception desk and the way inquiries are handled to establishing a wide-awake sales approach that'll move more product out of the modernized mill.

Works Here—This is the kind of thinking that's going on at Riverside Metal, now Riverside-Alloy Metal Div. of H. K. Porter Co., Inc. It doesn't add up to a pat formula that can be applied to every company in need of a new look. But these methods are doing wonders in the way of revitalizing an organization whose old ways were leading to limbo.

Walking into the Riverside, N. J., firm today, it's hard to believe that just a few years ago this was a dying company. Yet, as recently as 1954, Riverside was losing money and destined to lose more.

Dwindling profits of previous years hadn't been plowed back to keep apace with competition. The products—specialty nonferrous strip and wire—were good. But facilities were poorly organized, production techniques were antiquated and employee morale had ebbed to an alarming low.

Improvement Means Progress—It was at this point that H. K. Porter bought the ailing firm. Giving more than lip-service to the axiom that continual improvement is the key to progress, Porter installed W. Harvey Thompson as general manager with orders to make Riverside run.

The Porter interests came with money and a willingness to spend it. Their original estimate was half a million dollars, but three surveys and ten reports later Thompson launched a $1.5 million program of modernization.

Adds Products — In operation now for only a few months, the investment is already paying off. Savings over previous operating costs are at the rate of $300,000 a year, which will pay back Porter's investment in five years.

Output has been doubled with essentially the same work force. And the Division is now able to profitably produce a broader line of products — specialized phosphor bronze, nickel silver, beryllium copper and cupro nickel alloys which in times past were economically unfeasible.

The strip mill came in for the most attention. It was a nightmare of back and forth, handle and rehandle inefficiency. A complete new layout was devised, cutting actual measured distance of travel between casting shop and finished coils of strip from 4000 ft to 1200 ft—a reduction of 70 pct.

Bigger Bars Faster — Modern rolling and materials handling equipment played a major part. Formerly, 200-lb bars from the casting shop were manually fed into the No. 1 breakdown mill by a crew of five (three working while two recovered from the backbreaking effort). Now it's a completely hydraulic proposition handled by one man at a pushbutton console. And the slabs now weigh 900 lb, which means longer strip and bigger coils without welding further down the line.

A crane moves stacks of the heavy bars back and forth between the 2-high breakdown mill and a new 200-ft roller hearth annealing furnace. This was also a manual loading operation in the old setup.

While Porter management was willing to spend whatever it took to make Riverside a first-class concern, the money had to be spent wisely. Wherever possible, existing equipment had to be used. The big G. E. annealing furnace was purchased second-hand in Detroit, reconditioned, then shipped to Riverside. Total cost was about half what a new furnace would've run and the used one still does the job.

Teamed Up—Two slab mills and a flattener formerly arranged side by side and operating independently were relocated in series. Special equipment for turning bars over was installed. The bars now go through an uninterrupted, automatic straight-line cycle; they're "scalped" on one side, flopped over and milled on the other side, and get straightened simultaneously on the same line. Only half the operators are needed and it takes far less time.

A new 4-high Bliss intermediate rolling mill has replaced several

It Pay?

older mills. It's equipped with a run-around roller conveyor that takes the coils after each pass through the rolls and returns them automatically to the starting point for further reduction. Where ½-in. thick bars were previously rolled flat for four or five passes before being coiled, the new mill coils metal after the first pass.

The single Bliss mill provides greater production in one spot than the several older mills scattered about the plant. While it cost half a million dollars to install ($90,000 for electrical equipment alone), the new mill is paying big returns in labor savings and handling time.

Nothing Was Overlooked—Automatic tension-controlled winding equipment on the Drever furnace has speeded handling of coils after annealing and produces neat, uniformly wound coils of strip.

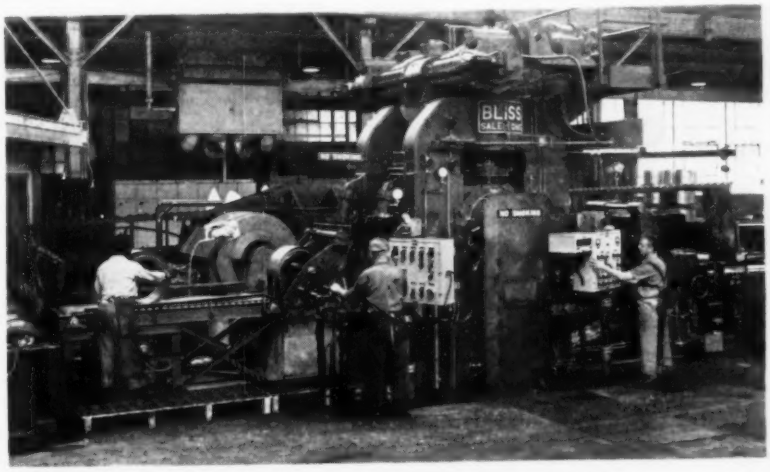
New Bell-type furnaces have increased annealing capacity and are improving metal properties. Where Riverside's Flexograin fine-grain phosphor bronze was formerly made in limited batches it's now turned out in routine, full-scale production.

Modernization didn't stop with major items of equipment. Almost everything in the mill had to be revamped to handle the increased production. Even accessories like payoff and rewinding reels on slitters had to be beefed up to take the heavier coils of strip now being produced.

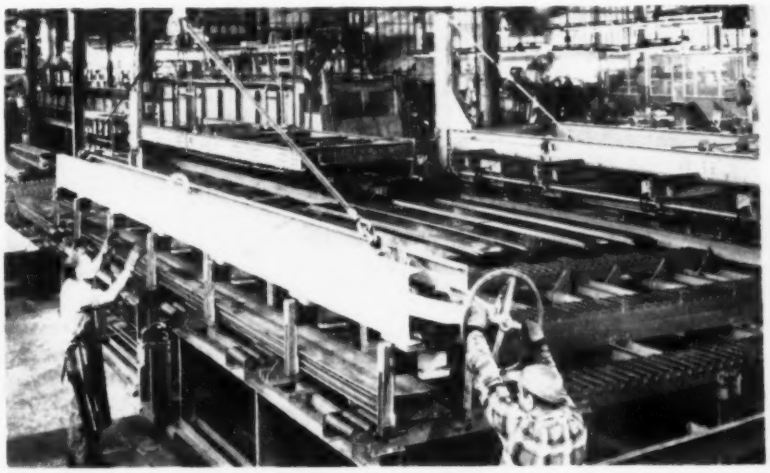
Today there's a new vitality at Riverside. It was born of the modernization program, but is being nurtured by the dynamic philosophies of an enlightened management.

Expansion and modernization have done more than just double output and open new fields of endeavor for the Division. They've infused a lick-the-world spirit in the ranks that no amount of money can buy.

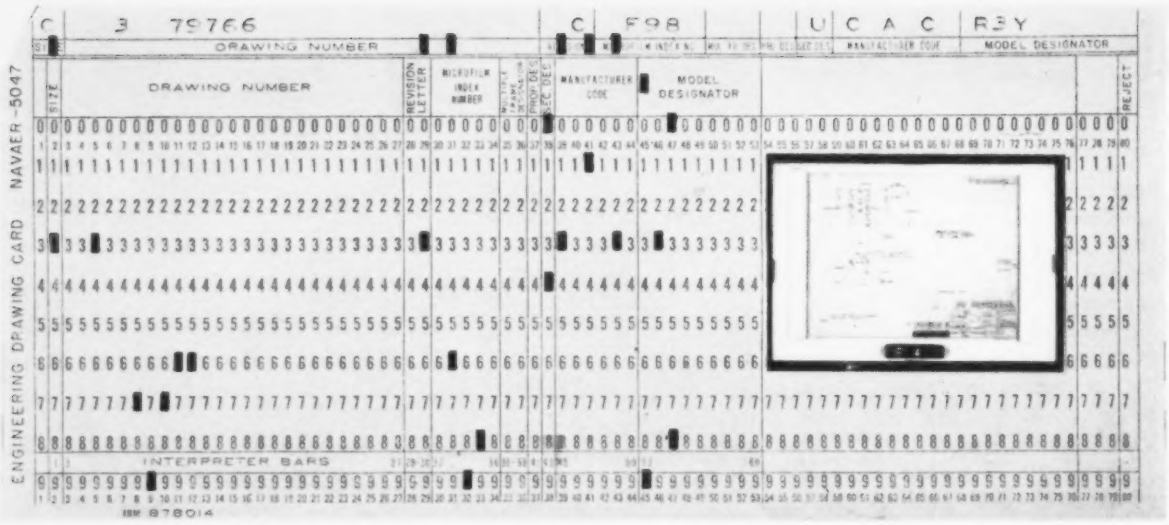
AUTOMATED MILL: No. 1 breakdown mill is pushbutton controlled by one man, now handles bigger bars. Five men were needed before.



SPEEDS RERUN: New 4-high Bliss mill is equipped with automatic run-around conveyor to bring coils back for additional passes.



CRANE FEEDS FURNACE: Stacks of bars are crane-loaded onto inclined rollers for transfer to annealing furnace in background.



FILM IN CARD: Microfilm mounts in die cut aperture. Entire card plus film can be reproduced at high speed.

Dry Printer Blows Up Drawings From Film

Much of the cost of keeping technical drawings up to date and in the field is in production.

Make a correction and all existing copies have to be altered. A field activity must wait for bulky drawings to be mailed.

New fast printing system from card mounted film bids to eliminate these production snags.

■ Under the traditional system of making engineering drawings, you have to keep a file of master tracings and a supply of individual copies. It makes a costly office routine and it's slow and inflexible.

Why not bring production methods for engineering drawings up to the level of other technological advances? The U. S. Navy, Bureau of Aeronautics announced recently that it has developed such a new system. It's a low-cost method of producing enlarged engineering drawings from microfilm.

Dry Printing—The heart of the new system is the Copyflo 24-in. continuous printer, developed by The Haloid Co., Rochester, N. Y., pioneers in xerography. It's an electrostatic process requiring no water, liquid chemicals or darkroom.

Instead of having to handle the master copy of drawings, you now use microfilm copies of drawings mounted on punch cards. Stack the cards into the machine and the automatic device produces copy up to two feet wide at 20 fpm.

The prints are dry when they come out and can be used immediately. You can get 400 prints from one microfilm frame by repeating exposure.

Discard After Use—With ease of reproduction and low cost factor, you can now discard the drawing after use, instead of maintaining costly drawing files. The savings can be seen when you realize that a modern fighter plane is represented by 25,000 drawings.

Filmsort Div. of the Dexter Folder Co. developed the punch card with a die-cut aperture for mounting the film. You use standard punch coding for sorting purposes.

Microfilm reduction ratios are 16x and 29x. The Copyflo printer enlarges either 15x or 20x. You can reduce A through D sized drawings for reproduction.

Light Sensitive — The Copyflo printer operates on the principle that things of opposite polarity attract each other. You project the microfilm image through a lens system onto a 24-in. wide, rotating drum.

The selenium-coated surface of the drum carries a positive charge to make it photoconductive. Where projected light strikes the drum, the charge drains away. The positive polarity remains where shielded by the opacity of the microfilm to form a latent image.

Negatively charged plastic powder cascades against the drum. The micronized powder adheres wherever the light did not hit. The resulting image transfers to positively charged paper.

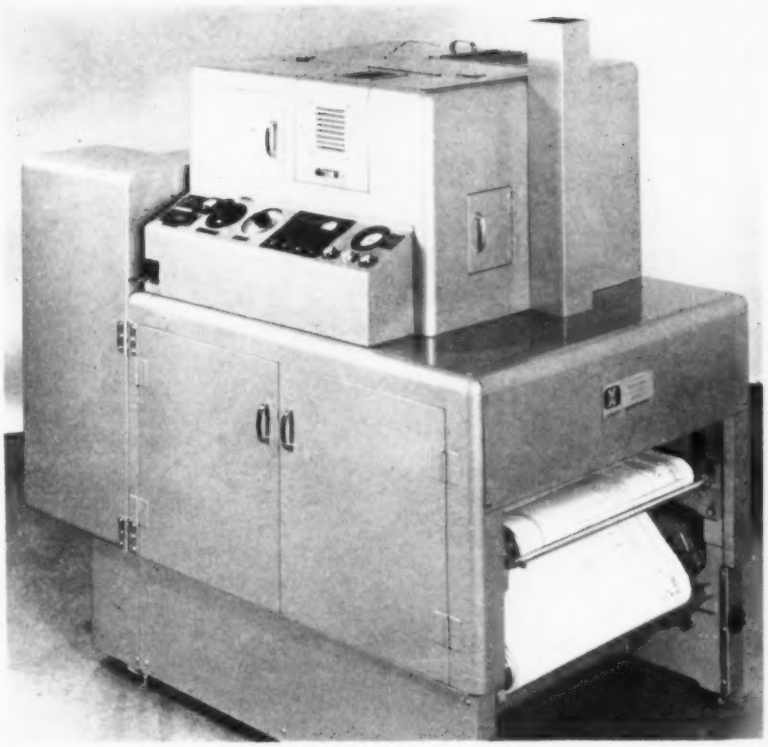
Heat Fuses—The paper attracts the negatively charged powder image from the drum to form a print. You fuse the powder to the paper with heat.

A "miss" detector in the film head will stop the card-feed mechanism if a card fails to appear. It also stops the machine after the last card goes through, but not until the last print is free of machine.

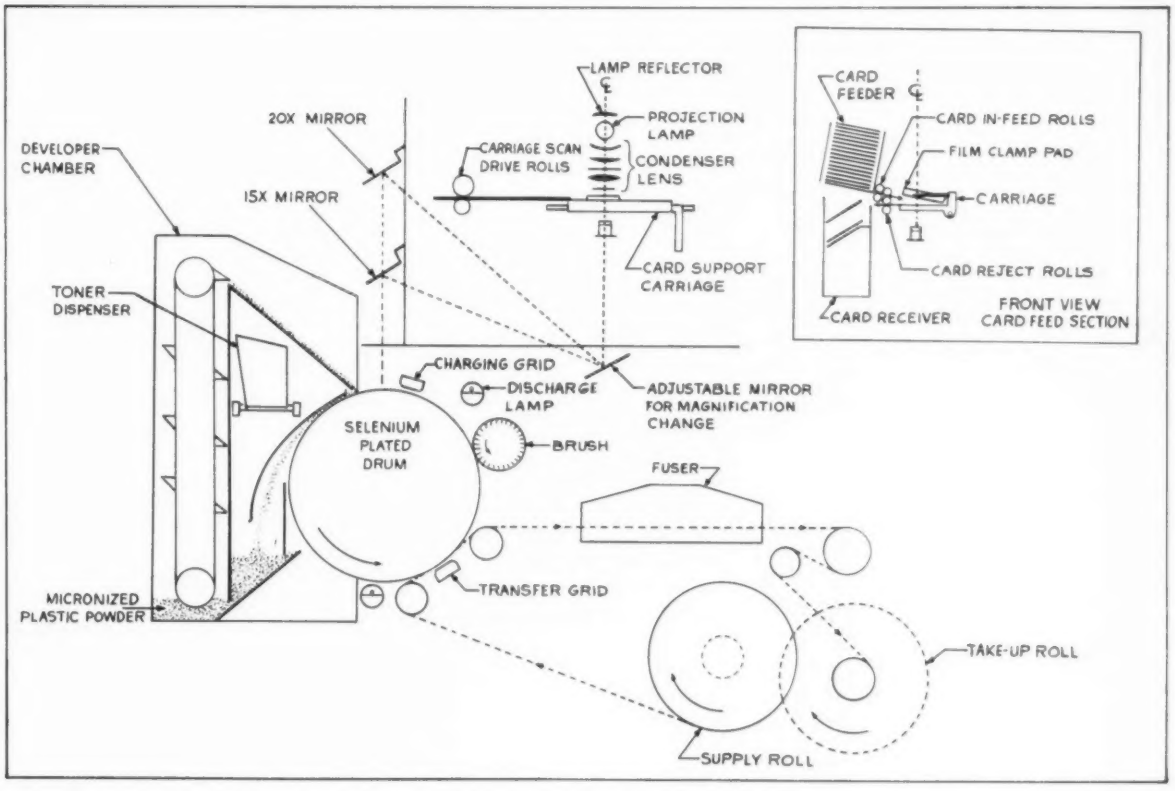
In cases where you wish to print directly from microfilm roll, you can mount an attachment on the Copyflo printer for either 16mm or 35mm size.

The system owes much to the ease of preparing the Filmsort cards. The Filmsort automatic mounter handles 2000 frames of film per hour. Not only that, but you can reproduce the cards at 900 per hour on the Filmsort automatic card-to-card printer.

For scanning and viewing the Filmsort cards, you use standard viewing equipment adapted for mounting cards.



COMPACT UNIT: Dry, electrostatic process rolls out drawings, 24 by 36 in. in size from 35mm film. Drawings are ready for immediate use.



SCHEMATIC DIAGRAM: From card feeder to take-up roll, continuous printer features low cost operation.

For High-Temperature Strength: Stainless or Tool Steel?

By E. A. Loria—Staff Metallurgist, Crucible Steel Co. of America, Pittsburgh

Properties of the two classes are matched against a group of realistic design objectives for supersonic missiles.

This implies short-term, one-time service, and so a limited field of application.

But actually, these comparisons help fill some of the gaps in our sparse basic knowledge on this vital subject.

▪ Where just a decade ago high strength at elevated temperatures was hardly more than a curiosity, today it's one of industry's greatest concerns.

Most of the attention is currently focused on heat-strength problems relating to high-speed flight—the so-called thermal barrier that's fast becoming the prime obstacle in aircraft and missile design. Service temperatures ranging from 800° to 1000°F are verging on the commonplace; that this will soon be extended to 1600°F seems a certainty.

But the need is growing just as acute in other fields, too, particularly turbines, chemical process equipment, and the whole range of nuclear applications.

While this study is aimed primarily at structural steel requirements for missiles, much of the information should be useful in these other areas as well.

Special Needs—Missiles call for steels to operate for short times at design temperatures and on a single-mission basis. This is very different from the needs for manned high-speed aircraft and in some respects much simpler to meet. It may even provide a field for some steels that aren't suitable in manned aircraft. Both annealed and heat-treated sheet will be used for wings, control surfaces and body structure. Plate, bar and forgings will be needed, in either condition, for miscellaneous formed and machined parts.

Quite a few factors enter into determining suitability of materials for this rugged service. A wealth of information can be gleaned from elevated-temperature tensile tests, supplemented by short-time stress rupture at the higher temperatures.

In the one group of steels tested are the stainless grades which comprise the martensitic, austenitic and pseudo-austenitic types. In the other group are the hot work tool steel types which are gaining wide recognition.

Tensile properties are based on a standard half-hour at temperature, 20 minutes to reach temperature and a strain rate of 0.005 in/in./minute up to the yield point.* Analyses of the various steels tested are shown in Table I. Heat treatment given each steel prior to testing is listed in Table II. Note that test data may pertain to either sheet or bar specimens.

Desired Properties—The design objectives used as a basis for this comparison of various steels are 270,000 psi tensile, 220,000 psi yield at room temperature; and

* Initial results show little difference between tensile tests taken after one minute at temperature and those made after a half-hour. The former is slightly higher and indicates that heating rate rather than strain rate at constant load is more important for short time intervals.

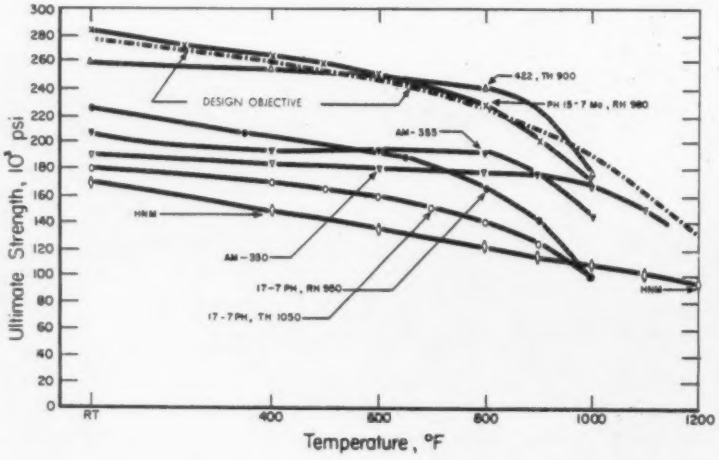


FIG. 1: Typical tensile values of stainless steels are compared with desired level. Only two come close at the 1000°F mark.

180,000 psi tensile, 150,000 psi yield at 1000°F. Elongation should be around 10 pct. In actual application, time at temperature would be less than 15 minutes and time at load would be around 30 seconds.

Because of their better corrosion resistance, stainless steels would seem the obvious choice. But since it's practical to clad low-alloy steel strip and sheet with 302 or 304 stainless (or some other coating) the hot work tool steels merit real consideration.

In Fig. 1, ultimate strengths of the stainless grades from room temperature to 1200°F are compared to design requirements. The slopes of these curves are indicative of structural stability and provide a quick estimate of overall structural efficiency of one material as compared with another.

Only 422 and PH 15-7 Mo meet the desired design properties up to 1000°F. All the other steels are significantly below desired values throughout the entire temperature range, regardless of heat treatment. AM-355 has better tensile values than AM-350 only up to 900°F, while 17-7 PH (RH 950) gives better results than 17-7 PH (TH 1050) through the same temperature range.

Yield Strengths Low — Tensile yield strength, shown in Fig. 2, is a realistic design characteristic which should be correlated with strain rate. None of the stainless steels meet desired yield requirements. Again, 422, PH 15-7 Mo and 17-7 PH (RH 950) come closest, but their values are 12 to 16 pct below the design values for 400° to 1000°F exposure.

Fig 3 shows how well the respective sheet and bar specimens meet the desired 10 pct elongation. Sheet will of course have lower values than bar stock when heat-treated to the same tensile strength level. The 12 pct elongation of 0.030 in. thick 422 up to 1000°F is noteworthy.

Summing up results on the stainless steels, 422 sheet tempered at

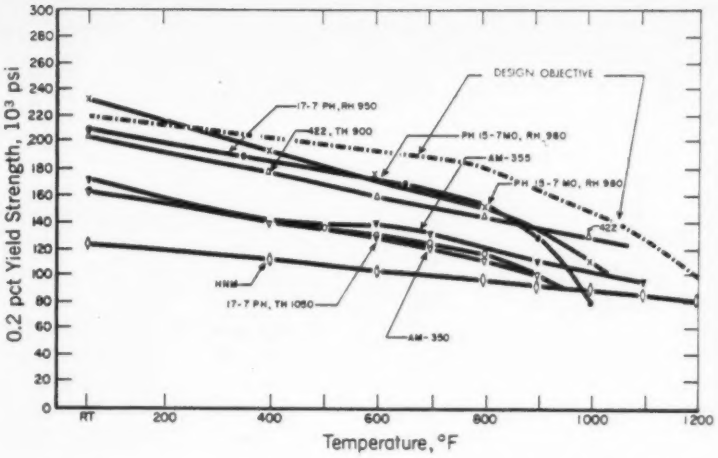


FIG. 2: None of the stainless steels tested reach design objectives for yield strength, fall 12-16 pct short in 400° to 1000°F range.

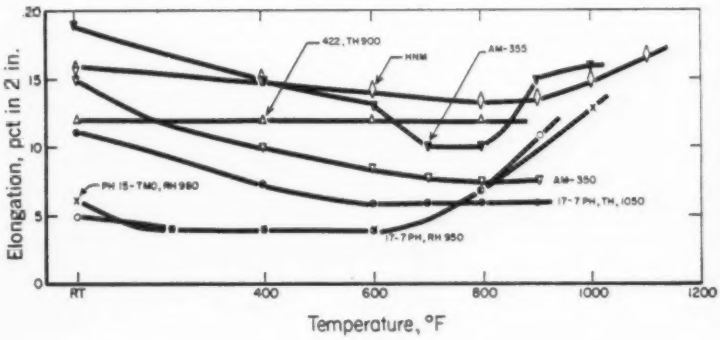


FIG. 3: Ductility fares better—most of the stainless steels meet the desired 10 pct elongation. Note steady 12 pct of 422 sheet.

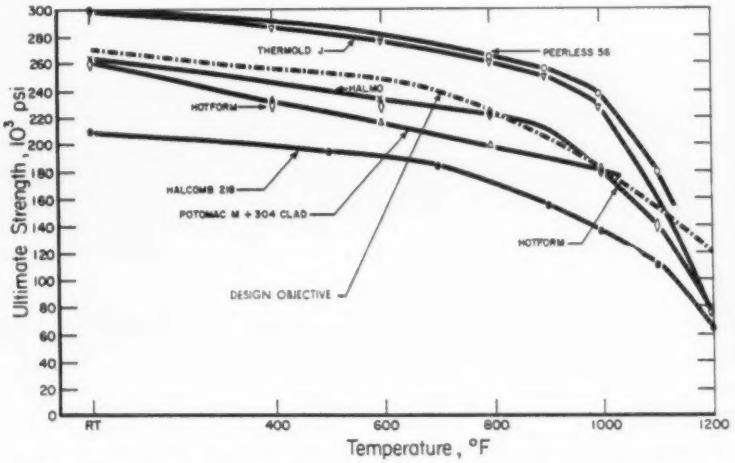


FIG. 4: Tensile strengths of two tool steels are well above desired level through whole range, two others cross it at 1000°F point.

900 F meets desired tensile and elongation values up to 1000 F, followed by PH 15-7 Mo. Also, its creep and rupture strength is higher than the other steels in the 800° to 1200°F range. Advantages of martensitic type 422, compared with austenitic types, are lower coefficient of thermal expansion and higher thermal conductivity.

A disadvantage is the dimensional changes that occur in heat treatment, which are greater than those in stable austenitic PH steel such as HNM. Of course, all the pseudo-austenitic steels transform to martensite for their maximum properties and all fabrication is done first when they are in the solution-annealed condition.

Directionally Equal — Another advantage of 422 sheet is that it's made to a ferrite-free composition balance and is therefore an isotropic material. This means that its properties are nearly equivalent in the longitudinal and transverse directions. This has not been the case for a number of stainless steels that have been continuously cold-rolled to produce high strength. Because the high strength of 422 is obtained by heat treating rather than cold working, directionality is minimized.

In design calculations, a single strength value may suffice, regardless of direction and whether stresses are tensile or compressive in nature. For example, compressive yield strength of 0.030 in. thick 422 sheet averaged 203,500 psi at 72°F, 170,900 psi at 600°F, and 168,800 psi at 800°F. These values are equivalent to tensile yield strength values.

Since much of an airframe is loaded in compression, stiffness of a steel assumes considerable importance as an airframe design parameter. Although the trend of tensile properties is usually a good measure of the trend of properties in true compression, the factors of column action or plate buckling must be considered in compressive loading.

Versatile and Strong—Hot work steels have been used for many years in tools requiring high strength and toughness at elevated temperatures. Their application to hot aircraft structures has been a recent development. Steels of this type are ideal for missiles in that they can be heat treated to tensile strength of 260 to 300,000 psi at high tempering temperatures and provide adequate ductility.

Up to 1200°F some of these steels have the highest strength/weight ratio of any commercial structural metal. A large measure of stress relief is possible in the double tempering operations; under some conditions the steels are air hardenable. Also, they have creep and stress rupture values comparable to superalloys at 1000°F.

Fig. 4 shows how well hot work steels meet desired tensile strength values up to 1200°F. Peerless 56 and Thermold J bars greatly exceed design requirements up to 1100°F, whereas Halmo and Hotform bars follow the trend line rather closely in the 600° to 1100°F range. The value for 0.040 in. thick Halcomb 218 sheet could be raised to the equivalent Hotform-Potomac M level by lowering the tempering temperature to 950°F.

An advantage favoring Peerless 56 and Thermold J is that they have the right combination of alloying elements to resist softening to

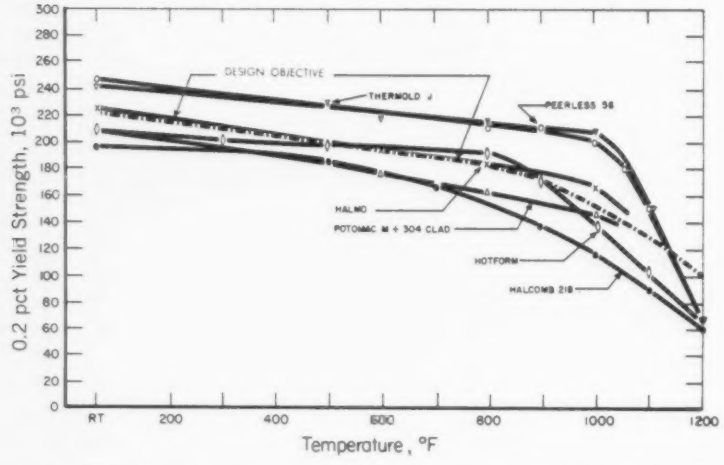


FIG. 5: Hot work steels show up far better than stainless where yield strength is concerned. Two exceed objective even at 1100°F.

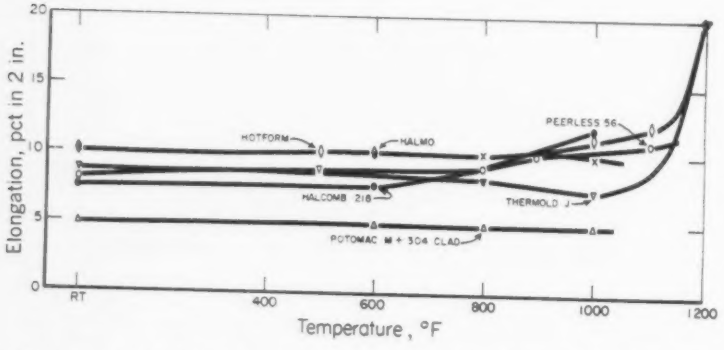


FIG. 6: Nearly all of the tool steels meet the 10 pct elongation requirement between 600° and 1000°F. Clad sheet stayed at 5 pct.

TABLE I—Composition of Steels Tested

Type	C	Cr	Ni	Mn	Mo	W	V	Si	P	Al
Crucible 422	0.22	12.0	0.70	0.65	0.95	0.93	0.25			
Crucible HNM	0.30	18.5	9.50	3.50					0.20	
17-7 PH	0.07	17.0	7.00							1.15
PH 15-7 Mo	0.07	15.0	7.00	0.70	2.50					1.35
AM-350	0.08	17.0	4.20	0.60	2.75					
AM-355	0.13	15.5	4.35	0.95	2.75					
Peerless 56	0.40	3.30		0.60	2.75		0.40	1.00		
Thermold J	0.53	5.00	1.50	0.35	1.38		0.98	1.10		
Halmo	0.35	5.15		0.30	5.15		0.65	0.70		
Hotform	0.40	5.00			1.30		0.50			
Potomac M	0.40	5.25			1.15		1.00	1.00		
Halcomb 218	0.38	5.20		0.35	1.40		0.40	1.10		

TABLE II—Heat Treatment Before Testing

Type	Cycle
422 (TH 900 Sheet)	1875 F for ½ hr, air cool, 900 F for 1 hr (endo. atmos.) +50 F dew point
Crucible HNM (Sheet)	2050 F for 15 minutes, air cool, 1350 F for 8 hr
17-7 PH (TH 1050 Sheet)	1400 F for 1½ hr, 60 F in 1 hr, 1050 F for 1½ hr
17-7 PH (RH 950 Sheet)	1750 F for 10 minutes, −100 F for 8 hr, 950 F for 1 hr
PH 15-7 Mo (RH 980 Sheet)	1750 F for 15 minutes, −100 F for 8 hr, 980 F for 1 hr
AM-350 (SCT Sheet)	1800 F for ½ hr, air cool, −100 F for 2 hr, 750 F for 2 hr
AM-355 (SCT Bar)	1750 F for ½ hr, water quench, −100 F for 2 hr, 850 F for 2 hr
Peerless 56 (Bar)	1950 F for ½ hr, oil quench, double temper 1000 F for 2 hr
Thermold J (Bar)	1800 F for 1 hr, air cool, double temper 600 F for 4 hr
Halmo (Bar)	1950 F for ½ hr, oil quench, double temper 1050 F for 2 hr
Hotform (Bar)	1850 F for ½ hr, air cool, double temper 1000 F for 4 hr
Potomac M (Sheet)	1850 F for ½ hr, air cool, double temper 1050 F for 2 hr
Halcomb 218 (Sheet)	1825 F for ½ hr, air cool, double temper 1125 F for 4 hr

a greater degree than the other steels at the highest exposure temperature.

Yield Strength Is High—As seen in Fig. 5, both Peerless 56 and Thermold J have yield strengths beyond 1100°F which greatly exceed the specified requirements. Halmo and Hotform meet these values up to 1000°F.

All of the steels except Thermold J meet the 10 pct elongation requirement in the 600 to 1200°F range. Higher-carbon Thermold J sheet will have even lower values than those shown for bars in Fig. 6. Elongations that can be expected in thin sheet are shown by results obtained for Halcomb 218. These values are on the low side of 10 pct when the steels are heat-treated to high strength levels.

A possible disadvantage to the use of hot work steel in skins is poor corrosion resistance. To overcome this deficiency, the results shown in Figs. 4 to 6 for a 5 pct Cr steel—Potomac M clad with 10 pct 304 and tested at 0.050 in. gage — are significant. Tensile strength is 270,000 psi at room temperature and 200,000 psi at 800°F. Up to this temperature, its tensile and yield strength are on the low side of base requirements but at 1000°F the clad steel does meet design values. Elongation of the clad sheet is only 5 pct.

Some modifications in chemistry will be needed to improve tensile ductility of hot work steels. This will give some grades a better strength/ductility relationship than others, and these improved types will gain favor.

Tool Steels Rate Higher — In summary, Peerless 56 and Thermold J have tensile and yield values that exceed desired properties up through 1100°F. Peerless 56 has acceptable elongation in the 800° to 1100°F range. Notch tensile tests at 80°F and 1100°F gave notch strengths 1.4 to 1.5 times the smooth bar strength. Since geometry of the specimen was such that the notch strength should be 1.5 times the tensile strength, Peerless 56 evidently is not notch sensitive under the conditions of this particular test.

Both Peerless 56 and Thermold J will be satisfactory for structural parts made from bars and forgings. Peerless 56 can also provide the highest strength sheet at the lower carbon level.

Comparing the stainless steels with the hot work steels solely on the basis of these design requirements, the hot work steels as a whole achieve a higher level of tensile and yield strength over the entire temperature range, and have the same elongation. A large number of them come closer to meeting desired tensile values than do the stainless steels.

Comparing the best steel of each group, Peerless 56 had 10 to 25 pct higher tensile strength than 422 or PH 15-7 Mo from 72° to 1100°F. The difference is even more significant on the basis of yield strength; Peerless 56 has 16 to 37 pct higher yield than 422, and 6 to 47 pct higher values than those obtained with PH 15-7 Mo in the 72° to 1100°F range.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th St., Philadelphia 39, Pa.

Match Drive And Bearing Seals

By J. M. Bryant—Chief Engineer, Dodge Ball & Roller Bearing Div., Link-Belt Co., Indianapolis

Mechanical drives and anti-friction bearings come in a wide variety of stock designs.

All are sealed in some way to exclude foreign matter and keep lubricant in.

Some seals rate better than others for specific jobs. Here's help on how to choose standard or special types.

■ The choice of an effective seal for a mechanical drive or an anti-friction bearing unit depends on the service conditions that will apply. Quite often, off-the-shelf drives and bearings are adequately sealed for ordinary use. But certain extreme service conditions may require special, auxiliary sealing devices.

There is a natural and harmful tendency for elements outside a bearing or drive seal to penetrate it. Such elements may be chemical or moisture-laden atmospheres, abrasive or absorptive solids, or liquids of various types.

Variable temperature of the drive or bearing housing coupled with large air volume within the housing will also influence this penetration tendency. Then too, temperatures above 200°F can speed the breakdown of certain sealing materials.

To Hold Lubricant—On the other hand, there is a natural tendency for lubricant to escape. Thus the sealing problem may involve either maximum retention of oil or grease, or maintenance of an acceptable escape limit. In this connection, the operating-temperature range of the bearing or drive unit is important.

Various forms of so-called clearance seals and contact seals are designed to cope with these "ingress" and "egress" tendencies. Standard pillow blocks and other anti-friction bearing blocks are regularly marketed with one type or another. Stock models of enclosed drives are also furnished with clearance or contact seals of the same general pattern found in bearing blocks.

Fig. 1 shows a variety of bearing block clearance seals; Fig. 2 illustrates several types of contact seals.

Stop Solid Particles—As a rule, clearance seals are the simplest way to prevent bearings or gears from being struck by solid material of large particle size. They're frictionless, they do not impede air move-

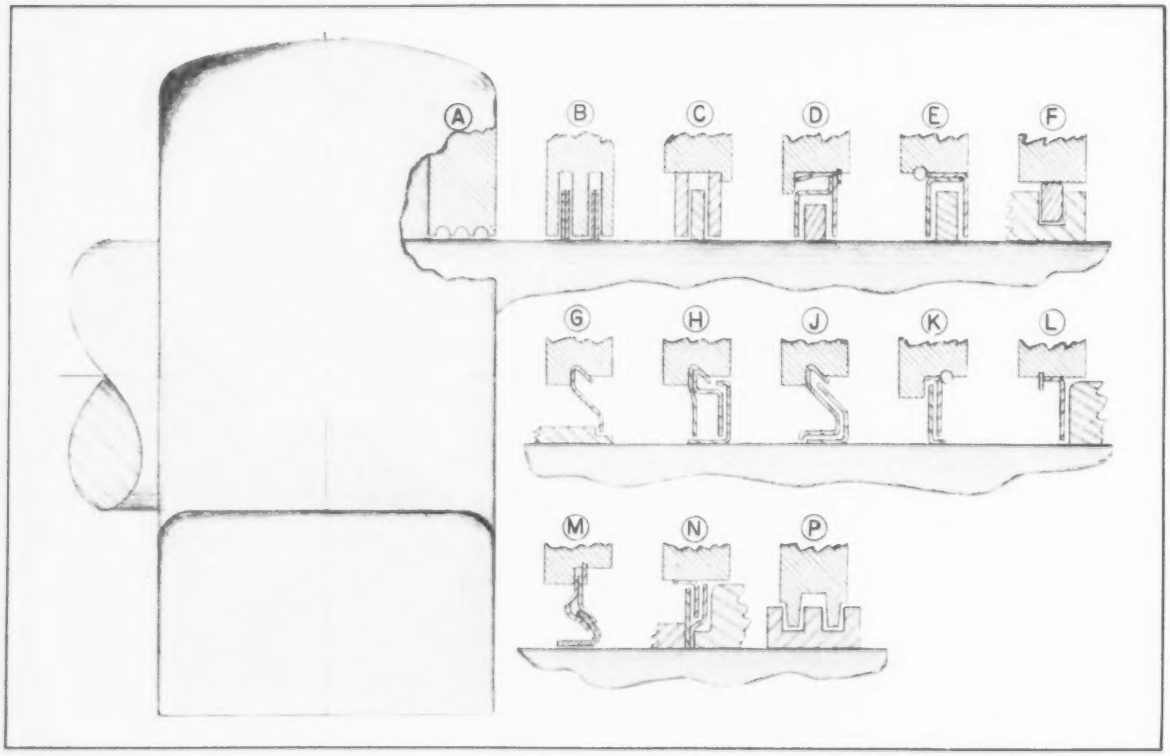


FIG. 1: Views "A" through "P" represent typical labyrinth or clearance seals furnished with stock anti-friction bearings. Similar types are supplied by producers of standard drive units for machinery.

To Service Conditions

ment through the seal, and they work efficiently despite minor imperfections in shaft surfaces.

Clearance seals also permit application of a fresh-grease flush without pressure buildup in bearings. The elements used in these closures are not, as a rule, affected by temperature.

However, clearance seals are sensitive where there is rapid air movement over the bearing or drive housing. And their effectiveness is often nil in those cases where material either spills directly on a bearing or buries it completely.

Some Limitations—As presently marketed, labyrinth-type clearance seals will generally be adequate for all applications, with the following possible exceptions:

1. Where chemical- or moisture-laden atmospheres are coupled with (a) variable temperatures in bearings or drives, (b) rapid air movement over housings.

2. Where the slightest escape of lubricant would mar or contaminate a product being manufactured.

3. Any dusty atmosphere where the temperature range or frequency of temperature change may cause "breathing" through the seal.

4. Where there is any direct liquid flooding or spillage of solid particles over the housing.

5. Where an accumulation of material will partially or completely bury the drive unit or bearing.

6. Where oil lubrication is accompanied by rapid movement of air over the housing.

Contact Means Friction—Contact seals, in contrast to clearance seals, cause frictional drag and a rise in temperature. They act to restrict air movement through the seal and they require a smooth, unmarked shaft surface for maximum effectiveness. Grease flushing with contact seals calls for pressure-relieving devices, also.

Moreover, most contact seals deteriorate rapidly at temperatures above 200°F. Silicone rubber resists this adverse temperature effect, but it cannot be used with silicone fluids.

However, contact seals are not as sensitive as clearance types where there is rapid movement of air over the housing.

In general, standard bearing and drive units equipped with contact seals will be adequate (within advertised speed limits) for all applications except the following:

1. Where bearings or drives will be partially or completely submerged under an accumulation of material.

2. Where chemical- or moisture-laden atmospheres are coupled

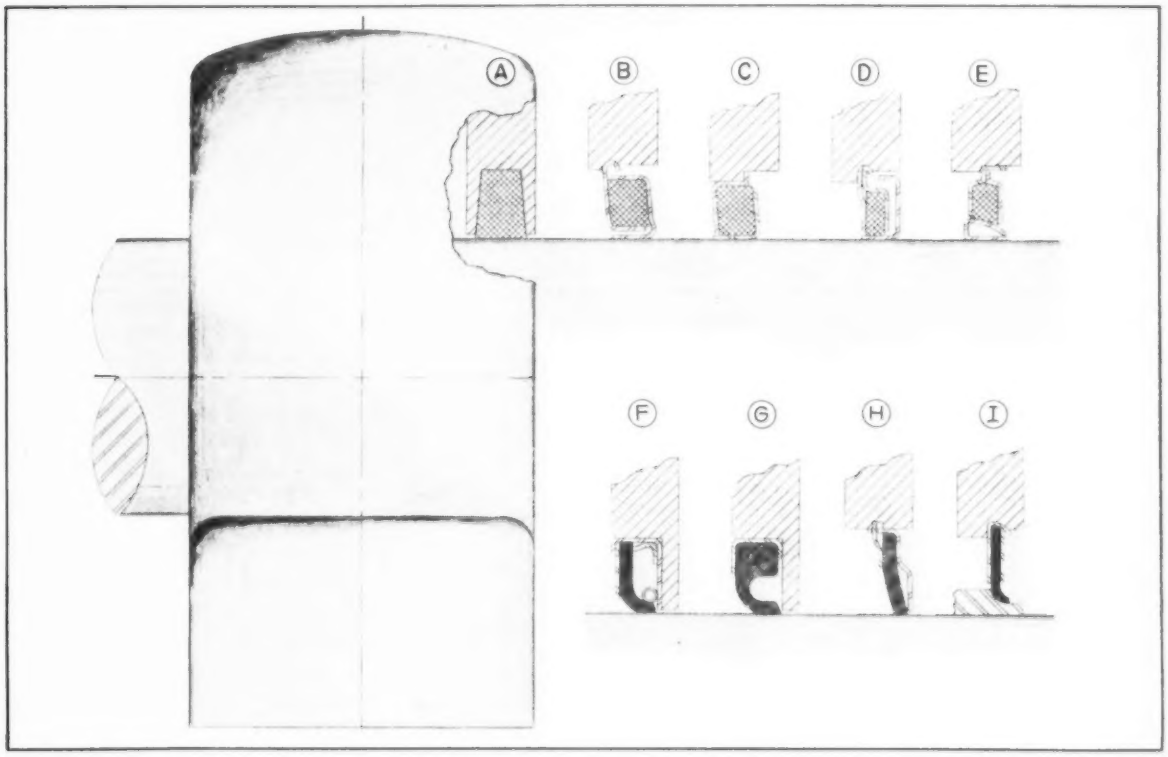


FIG. 2: Contact seals "A" through "E" are typical wool or dacron felt types; sketches "F" through "I" show synthetic rubber seals. Stock seals of this type may be affected by temperatures over 200°F.

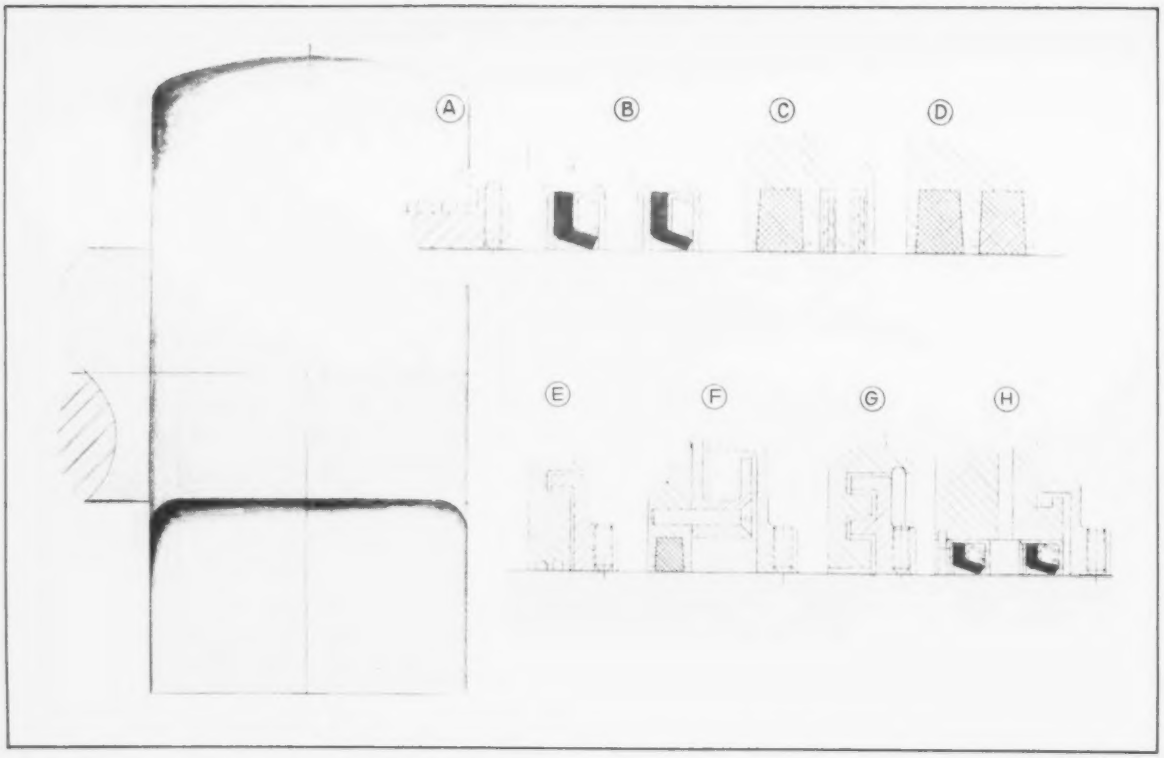


FIG. 3: Auxiliary seals such as these are among the means used to achieve trouble-free bearing operation under adverse conditions. Baffles and flinger devices also serve to deflect liquid or solid elements.

with variable temperature conditions.

3. Where water or liquid chemicals might flood over a housing.

4. Where temperature at the sealing surface is over 200°F.

5. Where extreme pressure (EP) lubricants may have an adverse effect on the seal.

6. Where seal torque would affect operation of equipment.

Ways To Help—In those cases where neither a clearance seal nor a contact seal can do the job alone, some means of auxiliary sealing must be used.

This is pointed up in the case of a foundry that used stock bearings with labyrinth seals to support the shaft of an elevator which handled hot, moist sand. But one particular bearing had to be replaced every week.

Investigation showed that the failure could only occur when the operating bearing was completely covered by sand. This didn't seem possible, but 24-hour check showed that it did actually happen during a second shift elevator cleanout period. Until another cleanup crew arrived during the third shift, the bearing ran under a sand blanket.

When deflector plates were installed to divert the sand from the bearing, the trouble disappeared. It shouldn't have happened in the first place. Unfortunately, those responsible for bearing maintenance were not aware of the service conditions nor the limitations of off-the-shelf items.

Fig. 3 shows some sketches of typical auxiliary sealing devices. In general, recommendations for these accessory media would include such ideas as:

1. Supports designed to keep housings away from spill areas, or deflector plates to divert spilled material.

2. Dual contact seals with space between them for grease. This helps where either spillage or complete burial cannot be avoided.

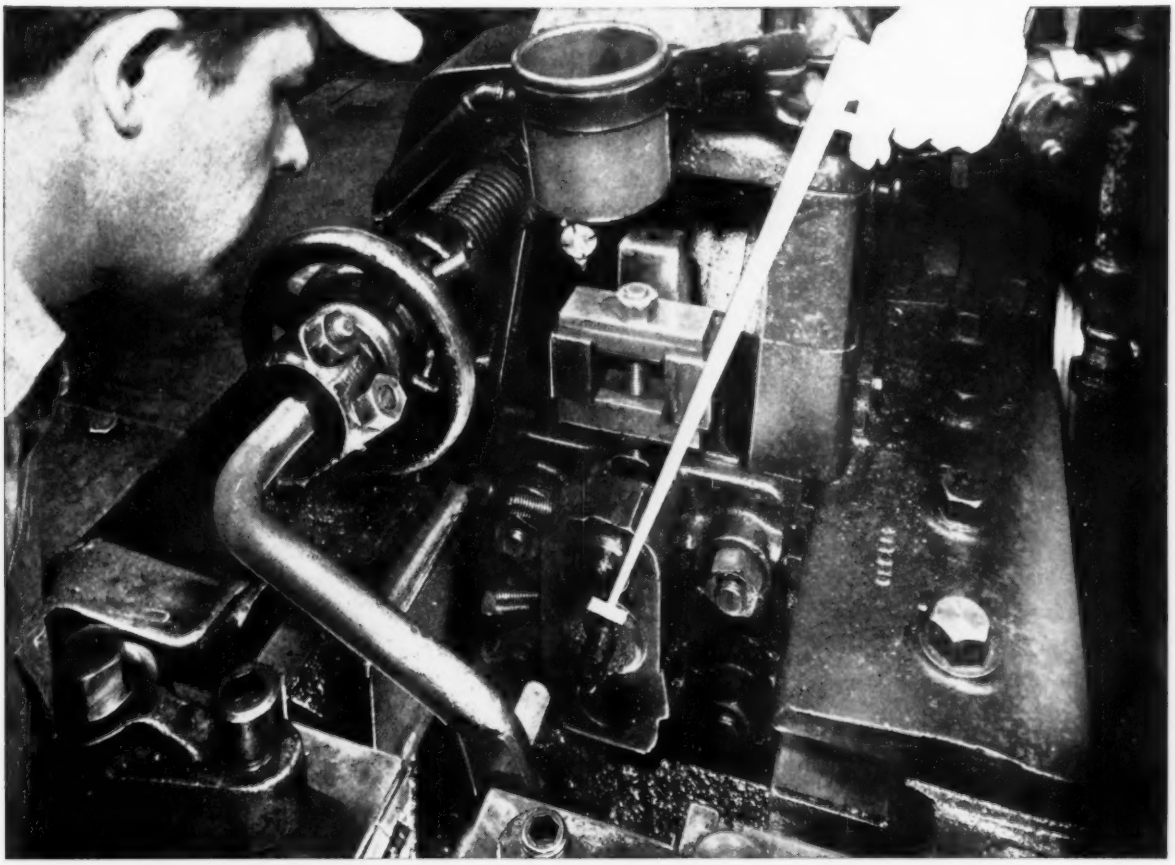
3. Coupling a clearance or labyrinth seal to the original contact seal.

4. Adding a rotating flinger or baffle to the original seal where there is a continuous flow of liquid over the housing. It may be best to make the baffle of corrosion resistant metal.

5. The use of breathers with filters. These are applicable where contact seals take care of the expansion and contraction of air within the bearing or drive. They prevent both loss of lubricant and ingress of dirt at the seals and confine air movement to the breather. The filter may be omitted where the atmosphere is clean.

6. The use of dry well seals and spring-loaded axial contact seals for worm drives. These help solve the lubricant-loss problem when a worm is below the worm wheel and the shaft seal is below the oil level. They're also recommended when a worm wheel shaft (low speed) projects downward and the shaft seal is below the oil level.

A Touch here does so much



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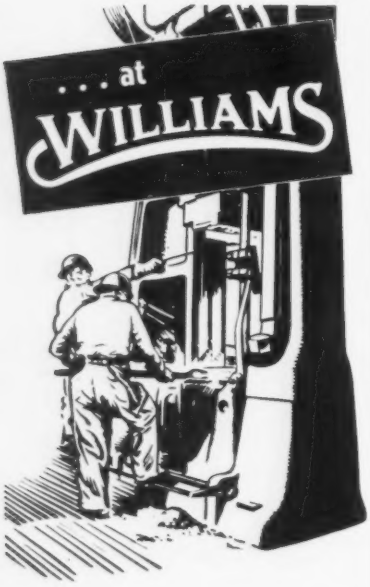

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 146.

Controls

Constant potential control for metal rolling plants is discussed in a 4-page folder. It lists outstanding features of a firm's potential control equipment. (General Electric Co.)

For free copy circle No. 1 on postcard, p. 146

Vertical Pumps

Short coupled vertical service pumps are covered in a 6-page folder. It explains many uses of the service pumps, including several installation plans. (Layne & Bowler, Inc.)

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Adjustable Gage

Adjustable indicator gages are reviewed in a 4-page folder. It includes specifications of three models, their sizes and the range of shallow dimensions which can be checked with each. (Ellstrom, Inc.)

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Self-dressing

The first of a series of progress reports reviews a permanent form control of grinding wheels. This uses cutters of cemented diamond particles. Co-developed with Jones & Lamson Co., the process permits complete grinder automation. It cuts out time for wheel dressing. (Koebel Diamond Tool Co.)

For free copy circle No. 4 on postcard, p. 146

Welding Steel

Welding of type 4130 steel is discussed in an 8-page publication. (Air Reduction Co., Inc.)

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Visual Controls

Visual control systems provide a fingertip method for charting operational data. These are described in a 4-page bulletin. It tells how the systems reduce record keeping, increase efficiency by sight-recording a complete set of facts to control production, etc. (Visi-Trol Engineering Co.)

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Tandem Trailer

Details of an integral-axle "fifth-wheel" tandem trailer suspension are given in a folder. The undergear is up to 500 lb lighter in weight than conventional leaf spring suspension undergear, the publication says. (A. O. Smith Corp.)

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High-Speed Steel

A new high-speed steel is analyzed in a data sheet. (Firth-Sterling, Inc.)

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Lathe

Featuring long life, a new lathe is described in a 4-page folder.

It lists specifications of the machine tool and offers a complete description. The unit has a 25-in. swing over the bed; a 16-in. swing over the compound. It has 18 speeds. (Boye & Emmes Machine Tool Co.)

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Salt Bath Austempering

Salt bath austempering is covered in an 8-page bulletin. It describes a one man mechanized salt bath installation for continuous heat treatment of tools. These tools are hardened to Rc 37/44 without distortion. (Ajax Electric Co., Inc.)

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Voltage Regulator

Maintaining constant output regardless of line voltage or load fluctuations is a new automatic voltage regulator. A data sheet describes this. (The Superior Electric Co.)

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Fuel Resistant Seals

Fuel resistant, fabric covered and fabric reinforced seals are described in a data sheet. For —65° to 400°F use, the seals are of fluorosilicone rubber. (Connecticut Hard Rubber Co.)

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Welded Chain

A welded chain comparison chart compares link measurements, load limits and pounds per 100 ft of the major chain types. These include proof, BBB, high test, Republic alloy, and crane (dredge) chain. (Republic Steel Corp.)

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Extra Narrow Tapes

One company's promotional literature describes a new tape slitting technique. Using this method, it produces standard 60-yd rolls of any pressure-sensitive tape in precision widths as narrow at 1/32 in. This process leaves perfectly clean

Five reasons why Townsend Versa-rivets* give you superior fastening

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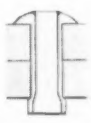
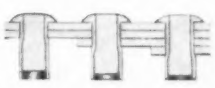
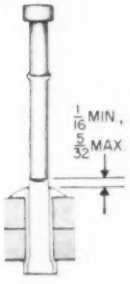


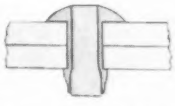
2 Positive Hole Fill



3 Wide Grip Range



4 Positive Inspection



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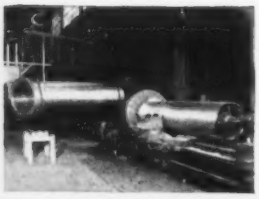
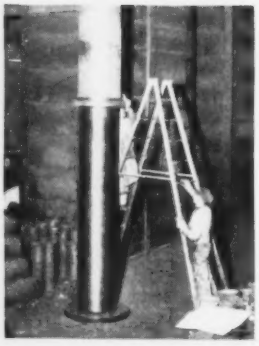

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FREE LITERATURE

edges and assures uniform width throughout the roll. (By-Buk Co.)
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Furnace

A company publication explains the economy and efficiency of a removable crucible furnace with new principle of operation. (Inductotherm Corp.)
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Gages, Threaders

Carbide gages and threading tools are described in an 8-page bulletin. (Detroit Tap & Tool Co.)
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Belts

Variable speed belts are depicted in an 8-page brochure. It offers four pages of tables giving belts applicable to various manufacturers' belt part numbers. (Worthington Corp.)
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Transformer

A portable variable transformer is illustrated in new literature. It describes a unit for applications where current requirements do not exceed 1.0 amp. (The Superior Electric Co.)
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Gage Instruments

Gage Laboratory Instruments and services are reviewed in a 20-page booklet. It explains how individual plants may set up their own gage labs to meet requirements for close control of parts measurements. (The Sheffield Corp.)
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Welders

DC motor-generator welders are described in a bulletin. These welders are 300 and 400-amp units. (General Electric Co.)
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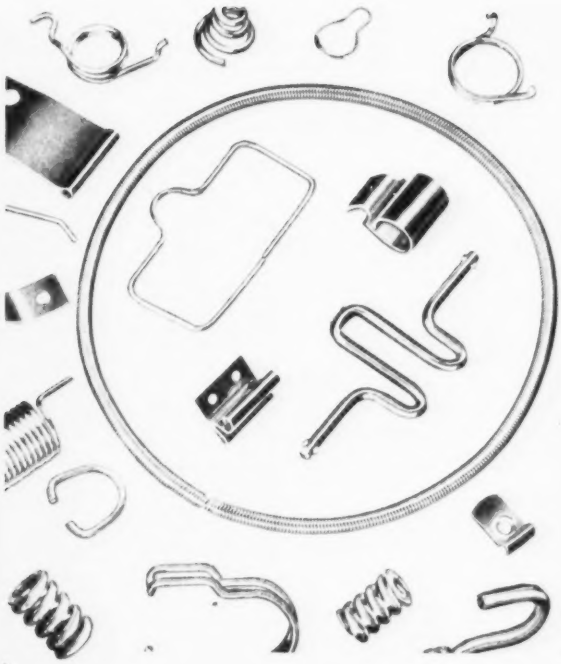

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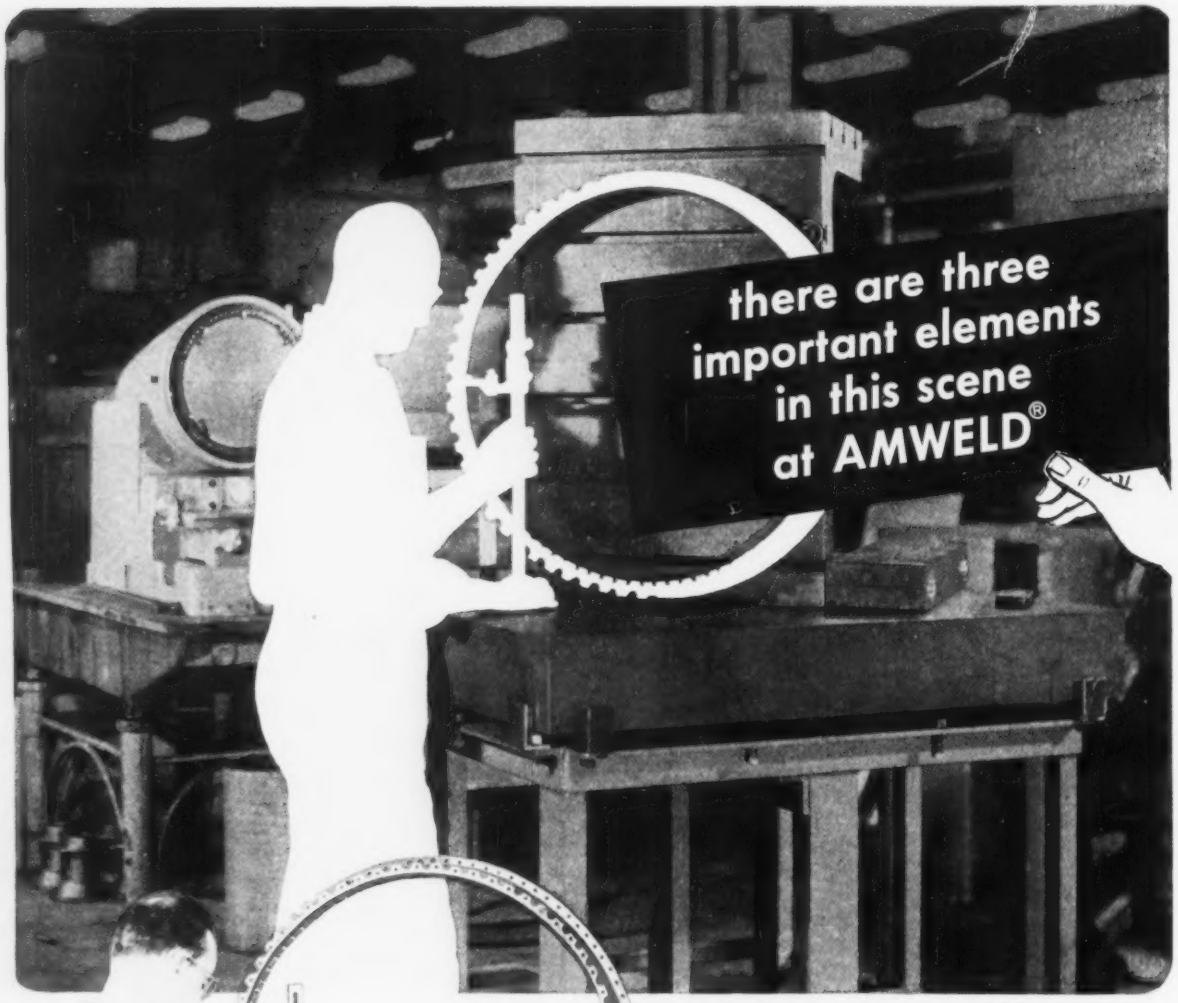

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FREE LITERATURE

This section starts on Page 140

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Shear Knives

An 88-page handbook gives data on shear knives, slitter knives, chipper knives and wearing plates. It details various grades of shear knives available and offers recommended applications for them. Also covered: proper care of shear knives. (American Shear Knife Co.)

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Handling Switches

How switches speed materials handling at one firm's plant is told in a 4-page bulletin. The bulletin also offers several tips on how to profitably use micro switches. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

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Synthetic Lubricants

Oils, greases, rust preventives, damping fluids and other synthetic lubricant-type materials are discussed in an 8-page brochure. (Lehigh Chemical Products Co.)

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Fractions to Decimals

Converting fractions to decimals is quick and easy with a new chart. The chart has a pressure-sensitive adhesive back. It easily sticks to practically any machine surface for handy use. (Beryllium Corp.)

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Mechanical Seals

Mechanical seals for boiler feed pumps and other hot water services are illustrated in a 4-page publication. It describes seals to meet every hot water pump application including handling of condensate in excess of 212°F, such as in closed-circuit non-vented back-to-boiler return systems. (Crane Packing Co.)

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Vinyl Resins

Vinyl thermoplastic resins are covered in a bulletin. This versatile material can be molded, extruded, used as a coating, or a sheeting. It has good workability, the publication says. (Firestone Plastics Co.)

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Resistance Welding

Resistance welding for mass-producing electrical contact, conductor and terminal assemblies is covered in a 10-page brochure. It illustrates samples of welded assemblies, special welding equipment and tooling required for mechanized handling. (Taylor-Winfield Corp.)

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Drive Unit

How a complete dc power conversion device steps up metalworking machinery's flexibility is told in a bulletin. Available in ratings from 5 to 200 hp, the package drive unit consists of a motor-generator set and control equipment mounted in a compact, ventilated cabinet. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 28 on postcard

Motor Care

Looking much like a cartoon movie are two booklets on motors. One tells how to make a motor "go, and go, and go" while the other explains how motor maintenance men can take step seven. The latter concerns proper installation procedures. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 29 on postcard

Barrel Tumbling

Case histories in an 8-page publication offer information on barrel tumbling. One interesting item deals with cleaning 70 tons of steel cast-

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **6/13/57**

Circle numbers for Free Technical Literature or information on New Equipment:

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FREE LITERATURE

ings in 16 hours at a foundry. Another reviews a firm's mechanical blasting of "push-button" transmission parts. Here, blasting does 85-pct of all deburring. (Wheelabrator Corp.)

For free copy circle No. 30 on postcard

Nuclear Pump Welding

Welding for nuclear pumping operations is covered in an 11-page report. It offers 15 do's and don'ts for nuclear welding. (Bryon Jackson Div., Borg-Warner Corp.)

For free copy circle No. 31 on postcard

Welding Alloys

A wall chart lists data designed to help welders choose the best welding alloy for maintenance and production jobs. (Electric Welding Alloys Corp.)

For free copy circle No. 32 on postcard

Precision Tools, Gages

Containing 96 pages, a catalog lists precision tools and gages. (Brown & Sharpe Mfg. Co.)

For free copy circle No. 33 on postcard

Magnetizers

Magnetizers are covered in a data sheet. It lists two: one an electromagnetic type; the other, the permanent-magnet type. (Indiana Steel Products Co.)

For free copy circle No. 34 on postcard

Pneumatic Control

Pneumatic control instruments are the subjects of a 44-page booklet. Some 10 pages are devoted to the general automatic control theory alone. (The Bristol Co.)

For free copy circle No. 35 on postcard

Filling Stainless

A bulletin offers data on a new material for filling stainless steel and aluminum honeycomb prior to contour machining. It's a hot melt, wax-like substance which is easy to remove from the metal honeycomb after machining operations. (Furane Plastics Inc.)

For free copy circle No. 36 on postcard

Ductility Tester

Users of thin gage sheet are expected to be interested in a catalog sheet describing a new ductility tester. It explains a simple, quick way of checking ductility before drawing. (Steel City Testing Machines, Inc.)

For free copy circle No. 37 on postcard

Pumps

Circulating and coolant pumps are described in a 4-page brochure. These pumps have no stuffing boxes, no pump bearings and no couplings. They're for sidewall or immersion mounting. (Ingersoll-Rand Co.)

For free copy circle No. 38 on postcard

Thread Sealer

An adapter that stops pipe thread leakage without specifying straight threads is covered in a catalog page. (Petch Mfg. Co.)

For free copy circle No. 39 on postcard

Motors

Fractional horsepower motors are described in a 16-page bulletin. It illustrates design advantages and shows components in the integrated insulation system of general purpose motors. (General Electric Co.)

For free copy circle No. 40 on postcard

Spring Steel

Cold rolled spring steels available from one firm are described in a 6-page folder. It explains the company's specialized quality and service. (Sandvik Steel, Inc.)

For free copy circle No. 41 on postcard

Power Saw

Massive; distinctive; rugged; powerful. That's how a publication describes a new vertical feed power saw. The machine has a 24 x 24-in. capacity. (DoAll Co.)

For free copy circle No. 42 on postcard

FLEXIBLE DESIGN

CUTTING ACCURACY

CONTINUOUS FEED

RUGGED CONSTRUCTION

Automatic Shears

BY

HALLDEN

THE SHEARING SPECIALISTS

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THOMASTON, CONNECTICUT

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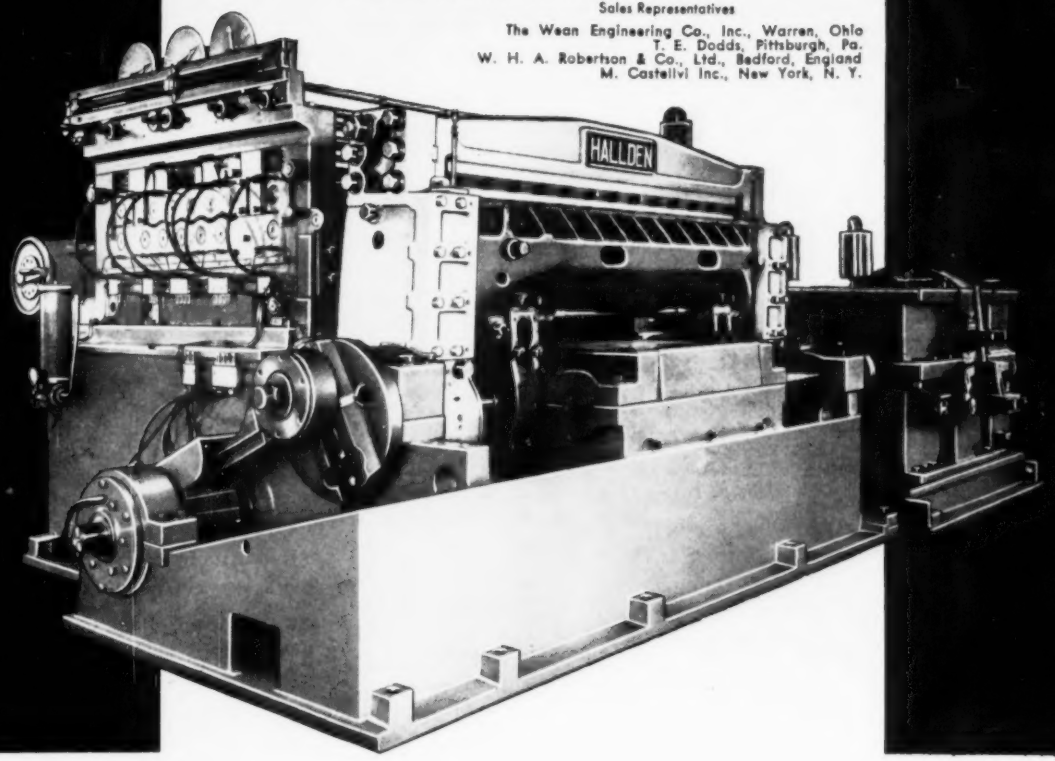
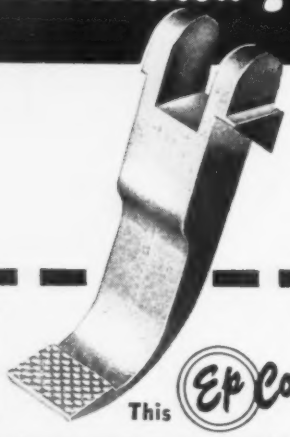


FORGING, COINING and MILLING Eliminated!



This Epco

INVESTMENT CASTING

Proves the Point

PART: Paper Gripper for Printing Press

MATERIAL: Alloy Steel 4340

PROBLEM: To lower costs substantially below those of difficult and expensive forming methods yet retain the following features:

1. Sharp reverse knurling for more efficient gripper action.
2. Maintain uniform gripping action from part to part.
3. Eliminate milling and coining operations.

SOLUTION: An EPCO Investment Casting - - It produced a sharp gripping pad in true relationship to the center line of part.

CONCLUSION: When the shape of a part makes it difficult or expensive to perform special forming operations check an EPCO Investment Casting as a possible solution.

Send us drawings, samples and specification of parts for detailed process analysis and cost quotation without cost or obligation.

Representatives Wanted
in Baltimore, Philadelphia, Detroit and Chicago areas.

ENGINEERED PRECISION CASTING CO.

Box I A 68 Matawan, N. J.

MEMBER INVESTMENT CASTING INSTITUTE

You Arbitrate It!

THE BURNED-UP HEAT TREATING OPERATORS

From the files of the American Arbitration Association.

For a number of years, a group of heat treating operators in a surgical instrument plant were paid an incentive rate for every unit they put through the furnaces. They received a separate allowance for set-ups; that is, for setting thermostatic and timing controls in line with the job order for each batch of work. Originally, a foreman would tell the men when a new set-up was needed. But gradually, over a period of time, the operators began to use their own judgment. This tended to result in a new set-up for almost every run.

When a new production manager was hired early in 1956, he devised different procedures. Heat treat operators continued to get the same rate, but the work was grouped so there would be fewer set-ups during the day; the decision as to where a new set-up was needed was left to the foreman. This naturally involved some loss of income.

Union Burns Up—The union was burned up at this change, citing a clause in the contract which read: "All production standards in effect when this agreement becomes effective shall be considered permanent."

"That has nothing to do with the case," answered the personnel manager. "We're not changing production standards. We're merely rearranging the work more efficiently and continuing to pay the regular rate for production and set-ups. We are reducing the number of set-ups required, but that gives operators that much more time for straight production."

No agreement was reached and the matter eventually went to arbitration. How would you rule?

The Arbitrator Ruled:

He held that the parties had never agreed that there had to be one set-up for every order. The flow of work and the specifications for production were clearly within the authority of management. He concluded: "Failure of management to place this responsibility on supervision earlier can not be construed as consent to a set-up allowance for each order." For this reason the arbitrator denied the grievance.

NEW FILMS

"Machining Stainless Steels" shows how to work free-machining steels at high production rates. It demonstrates tool composition and proper use of various tools. Tool grind principles are outlined. Proper setups to assure rigidity and prevent vibration and shock to tools appear. 30-min. 16-mm sound. The Jam Handy Organization, 2821 East Grand Blvd., Detroit 11.

"Chameleon of Metals" spectacularly presents the story of aluminum. It illustrates the metal's color and texture possibilities to designers, architects and engineers. 18 minutes. 16-mm sound, or 35-mm Eastman color. Motion Picture Section, Alcoa, 1501 Alcoa Bldg., Pittsburgh 19.

"The Role of the Industrial Nurse" has as its theme the orientation of a nurse in the medical organization of a large industrial company. 15 minutes. 16-mm color, sound. Jones & Laughlin Steel Corp., Public Relations and Advertising Dept., Gateway Center, Pittsburgh 30.

"Arbitration: An Actual Hearing of a Labor-Management Dispute" presents an on-the-spot, unrehearsed view of an actual arbitration session. It shows how a typical hearing is conducted, what is expected of participants, and how this collective bargaining technique operates to benefit workers and employers alike. 30 min. 16 mm sound. American Management Assn., 1515 Broadway, N. Y. 36.

"Turret Drills" shows how the tools are made and how they operate. 25 min. 16 mm. black-and-white. Berg Tool Mfg. Co., Inc., 15001 S. Fiqueroa St., Gardena, Calif.

"Modern Methods for Joining Metals" shows several welding processes and applications. 20 min. color sound. Linde Air Products Co., div. of Union Carbide Corp., 30 E. 42nd St., New York 17.

Improving wire rope service with **LESCHEN** HKP *Red-Strand*

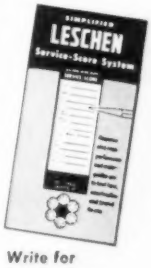
This one test proves which wire rope serves you best

"Problem jobs" may frequently make you wonder about the rope you're using.

Are you faced with unusual operating conditions? Is the rope the right type—size—grade—construction? Is greater tensile strength needed? Are you using the right brand?

The test is to use Leschen's on-the-job Service-Score Sticker reports. Keep the score—know the results—and questions are answered.

Then check with your Leschen man for engineering help. And, be sure to use Leschen's highest quality, service-proved Red-Strand wire rope. *Leschen Wire Rope Division, H. K. Porter Company, Inc., St. Louis 12, Mo.*



Write for Service-Score Fact-Folder

HKP LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.

Proof of Vulcan Tool Steel Superiority:

Tooling Downtime Reduced PRODUCTION UP 15%!

Vulcan TM-6, "M-2 type" high-speed tool steel, has increased tap life by 15% at Detroit Brass & Malleable Company, Wyandotte, Michigan.

Eight years of closely-controlled "stand up" tests of milling cutters and thread hobs preceded the selection of TM-6 for exclusive use in threading and tapping machine operations. *The payoff:* Production records, for the past seven years, offer positive proof of 15% better performance by using Vulcan TM-6.

Comparable on-the-job performance information is available for many of Vulcan's other steel grades. For the name of your nearest Vulcan representative write, wire or call collect. Vulcan Crucible Steel Division, H. K. Porter Company, Inc., Aliquippa, Pa.

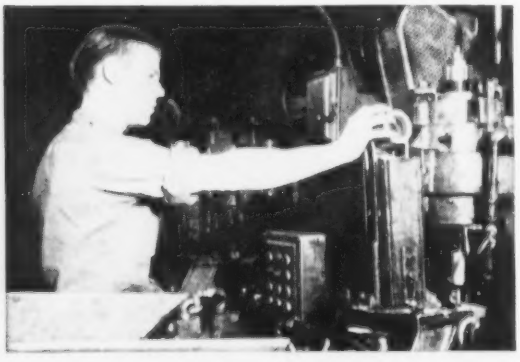


Photo at top shows General Foreman Robert Welch giving "specification plus" okay to DBM fittings as Vulcan representative examines tap used in manufacture.

Photo at left shows typical tapping machine operation at Detroit Brass & Malleable Company's nine-acre site.

HKP VULCAN CRUCIBLE STEEL DIVISION
H. K. PORTER COMPANY, INC.

TECHNICAL BRIEFS

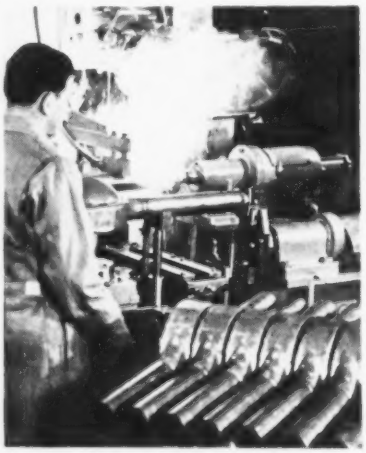
CO_2 Welding Reduces Material Costs

Less materials consumption, less handling and less maintenance result from installing CO_2 weld units into an automated line.

They speed production, too.

▪ CO_2 welding is handling production work on a full-scale, highly automated line for a major automaker.

In use by Ford Motor Co. are a battery of units employing Westinghouse Electric Corp.'s new carbon dioxide welding process. The units



This unit welds rear axle housings at speeds to 140-sipm.

weld components of rear axle housings into integral parts.

Speeded up welding operations are reported for the process, which uses a jet of CO_2 to force normal

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 145. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

atmosphere away from the weld area prior to adding powdered flux. The firm says that materials costs are down from 10 to 25 pct. Handling and maintenance expenses are also reduced. The latter is accredited mainly to the fact that the side delivery of CO_2 extends the time the equipment can be operated before nozzle cleaning is necessary.

Cut Floor Time—Production engineers find high welding speeds reduce floor time for welding operations by about 32 pct. In production welding a differential cover to a housing, the CO_2 process permits speeds of 140 sipm. Total time needed for the operations is 28 seconds, rather than an earlier 39.

Equipment at one plant includes 71 Westinghouse heads on 31 automatic welding fixtures supplied by Agnew Electric Co. and Expert Welding Machine Co.

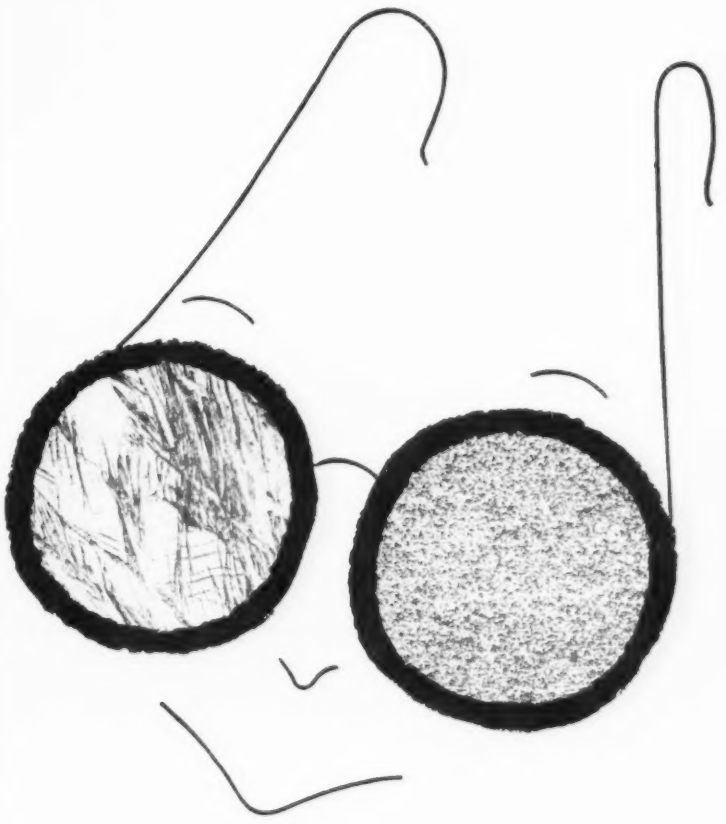
Hard-surfacing Saves Pieces from Scrap

By hard-surfacing worn cylindrical parts a welding firm saves its customers the burdensome expense of new equipment.

Using a submerged arc welding process, the Great Lakes Welding Co., Detroit, employs a welding head, installed on each of two lathes. With this setup, it quickly surfaces such parts as paper mill rolls and blooming mill table rolls. These parts would have to be scrapped unless rebuilt by hard-surfacing.

Lathes Adjustable — One lathe handles parts to 54-in. diam and 18-ft long. The other takes pieces to 30-in. diam and 12-ft long. The lathes are adjustable, permitting surfacing of different diameters on a single part.

Supported on the lathe tool carriage, the head moves automatically at a set rate. Meanwhile, chucks driven by the headstock rotate the worn part. The rotating workpiece is grounded by a sliding contact which bears against the outside of the chuck. The flux hopper, containing Unionmelt No. 80 flux, and



You can see the difference

. . . not with the naked eye, we'll admit . . . nor even with bifocals, but put a polished and etched sample of our new FLEXOGRAIN phosphor bronze under the revealing eye of the microscope and compare it with phosphor bronze strip generally available.

The scientifically controlled, fine grain structure of FLEXOGRAIN is great for severe bending and other complex forming operations . . . improves fatigue resistance, surface finish and ductility . . . and cuts costly fabrication rejects to a minimum.

At Riverside-Alloy we have always been keenly aware of the importance of grain size control in determining functional and fabrication properties of our alloys. We have been supplying fine grain phosphor bronze strip for special applications for over 20 years. Now, with our recently expanded, modern facilities, we can supply production quantities to meet your needs.

For detailed information write to Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.

Send today for Technical Bulletin T-4.

ALLOY METAL WIRE
Prospect Park, Pa.

RIVERSIDE METAL
Riverside, N.J.

PRENTISS WIRE MILLS
Holyoke, Mass.

HKP RIVERSIDE-ALLOY METAL DIVISION
H. K. PORTER COMPANY, INC.

Keystone integrated aluminum conductor systems feature long life, minimum downtime, low installation costs, increased safety and high current capacity. Surrounding photo shows system being installed.

No winter downtime with Keystone Aluminum Conductor System

For two winters—and going into the third—Niagara Mohawk Power Company, Buffalo, has enjoyed trouble-free service with a Keystone integrated aluminum conductor system. The system replaced one of wire used with Niagara's traveling coal storage towers.

Service conditions are severe here. Ice is a big problem. Sulphuric acid fumes from coal piles cause corrosion. But with aluminum Inverted-V Keystone conductors and enclosures, these problems are solved.

Other advantages of Keystone integrated conductor systems improve operations indoors, too. Low voltage drop—rugged components—no wires to burn down. Steady operation is assured.

For further case history information and data on use of Keystone Aluminum Conductor Systems, call or write *Electric Service Works, Delta-Star Electric Division, H. K. Porter Company, Inc., Philadelphia 32, Penna.*

HKP ELECTRIC SERVICE WORKS
DELTA-STAR ELECTRIC DIVISION
H. K. PORTER COMPANY, INC.

the wire reel are positioned above the head.

Takes Less Labor — Since the controlled operation of the head is fully mechanized, parts are surfaced with comparatively little operator time. Once welding starts, the machine continues automatically, requiring only occasional attention. Welding speeds vary from 30 to 60-ipm, depending upon deposit thickness.

As the metal is deposited, each weld bead unites with the bead next to it as well as with the metal below. If required, several layers of metal are deposited until the original diameter of the part is restored. By using the proper wire, a surface is produced that is actually harder than the original part.

Head, flux hopper, wire reel and controls mount on the carriage.

Back To Service — After the metal is deposited, the new surface is machined or ground to provide any desired finish. The hard-surfaced part is then returned to service. The submerged arc welding process used is a product of Linde Co., a division of Union Carbide Corp., New York City.

Resin Patches Metal

Epoxy resin compounds can often save a piece from the scrap pile. Such an epoxy resin material mixed with micronized aluminum

and other ingredients applies as putty. On hardening it becomes a metallic solid, machineable, waterproof and chemically stable. Known as Metalset A2, it's non-shrinking. The compound has good adhesion to iron, steel, aluminum and other materials. Easy to mix it's available from Smooth-On Mfg. Co. of Jersey City.

Electron Unit Drills Steel, Diamonds

Using a high velocity stream of electrons as its "drill bit," a new drilling unit easily pierces steel, stone and diamonds. It makes an extremely fine hole, 0.004-in. diam or smaller, to about 1/5-in. deep.

The drill, patented by a German inventor, employs a tubular gun with an electron-emitting material such as tungsten. A beam of electrons from the battery-powered gun is focused with the aid of an electromagnet at the object to be drilled.

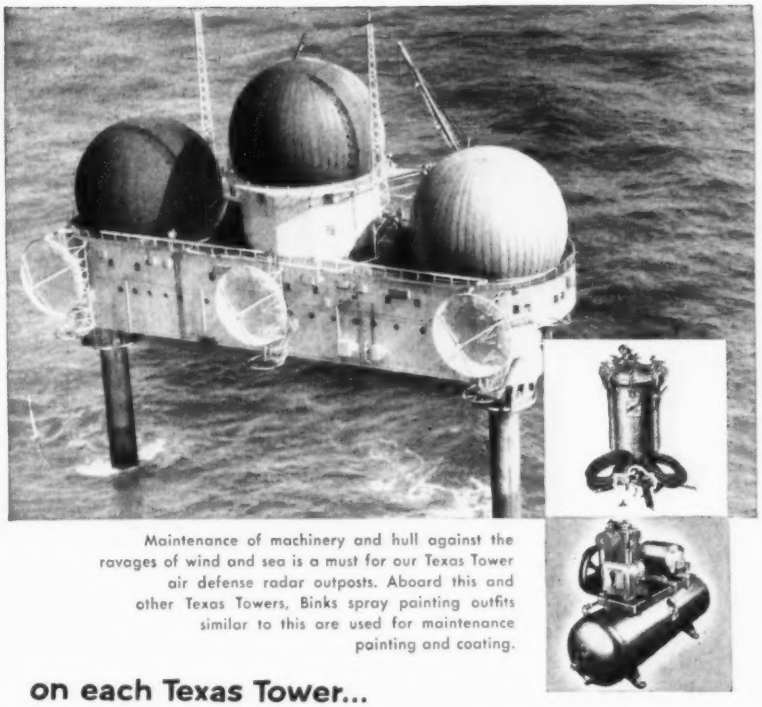
High Temperatures—Developed in Europe during World War II, the patent for the drill is assigned to Carl Zeiss of Heidenheim, Wuerttemberg, Germany. It has been tested on such materials as tungsten, porcelain, molybdenum and diamonds. The unit produces extremely high temperatures. In drilling diamonds, its inventor discovered that the temperature sometimes gets so high that problems arise; unless the electron stream is reduced and oxygen added to cool the diamonds, they disintegrate.

The drill's developer, Heinz Steigerwald, also has patented a method of producing tiny metal balls by using electron streams.

Slits Narrow Tapes

A new slitting technique lets a tape maker turn out extra-narrow pressure-sensitive tapes. These come in standard 60-yd rolls in precision widths as narrow as 1/32-in.

Now employed at the Los Angeles plant of By-Buk Co., the



Maintenance of machinery and hull against the ravages of wind and sea is a must for our Texas Tower air defense radar outposts. Aboard this and other Texas Towers, Binks spray painting outfits similar to this are used for maintenance painting and coating.

on each Texas Tower...

Binks spray painting outfits help fight the spray of the sea

Texas Towers are men and steel, matched against the might and muscle of the sea...the savage elements of nature. Their mission is to maintain a never-ending radar vigilance against the possibility of enemy air attack...to provide our own combat aircraft a few precious additional minutes.

All activity aboard the Texas Towers is aimed at keeping the electronic gear functioning at top efficiency. A vital part of this activity is protecting all weather-exposed surfaces and interior spaces from deterioration. We are proud to say that the paints and coatings used for this purpose are applied with Binks spray painting outfits.

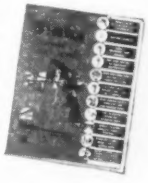
Integrated equipment

Binks spray painting outfits are carefully integrated packages... spray gun, hose, pressure fluid tank and air compressor are designed and combined to function as an easy to use, completely dependable unit.

As a matter of fact, all of Binks 1100 plus items of spray painting and coating equipment are designed for fully integrated operation.

Complete information

If you would like a copy of Binks Catalog 956, it is yours for the asking. Or, if you wish assistance on any spray painting or coating problem, manual or automatic application...call your nearest Binks Branch Office or write direct to the address below.

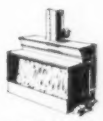


Ask about our spray painting school
Open to all...NO TUITION...covers all phases

Binks
EVERYTHING FOR
SPRAY PAINTING

SPRAY GUNS

FLUID TANKS


SPRAY BOOTHS

Binks Manufacturing Company
3124-30 Carroll Ave. West, Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

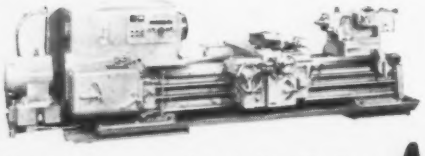
said the chip...

"I do a tale unfold"

This lathe chip, like many, many others, will go to the scrap pile. But there can be gold in the story that it tells.

Its color, size and shape pose questions like these: Is too much heat being generated by excessive speed, thereby causing short tool life and work distortion? Is speed too low, with resultant production loss? Is the rated horsepower of the machine too low or possibly too high for the expected metal removal? Is work finish unsatisfactory? Compressed into one overall question, is the inbuilt productiveness of the machine being realized on every cut of every part, day after day?

There's one certain, affirmative answer. Use Monarch's ultra-modern lathes—the Series 62 Preselector Dyna-Shift; the Series 80 and 90 Heavy Duty Dyna-Shift; the Series EE Model 1000. Chips from them are daily unfolding tales of increased output and lengthened tool life. It's quite possible the lathe chips in *your plant* would tell a story of real cost reduction, if "Made By Monarch". *The Monarch Machine Tool Company, Sidney, Ohio.*



You've never seen another machine like the Monarch Dyna-Shift Lathes with their "thinking headstocks." The Series 90 (above) is typical of a complete range of sizes featuring the Dyna-Shift way to reduced turning costs.

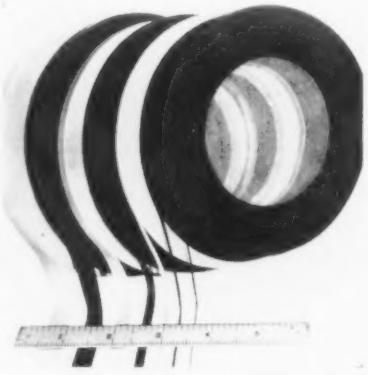
Monarch

TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

process leaves perfectly smooth clean edges. Throughout the roll the width is uniform.

Masks Paint — For spray paint masking, the firm produces special decimal or fraction sizes of regular masking tape between any standard



Wide or narrow, the tapes have perfectly uniform edges.

widths. This includes black printed circuit tape as well as masking material.

For permanent metallic decorative purposes on finished products and name plates, the company makes narrow widths of a new "gold" polyester pressure sensitive tape. This can be cleaned like any polished metal.

End Welds Alloy Studs

Thanks to a new method, end welding of aluminum studs may be simplified considerably. The technique makes use of a new stud welding idea and a new welding gun. These provide an automatically controlled protective atmosphere of inert gases during welding of the aluminum alloy studs. Nelson Stud Welding Div. of Gregory Industries, Inc., Lorain, Ohio, recently received a patent on the idea.

Reactors Are Portable

Nuclear reactors are now being mass-produced. Aerojet - General Nucleonics, San Ramon, Cal., has

completed three of the units and these are now in actual operation. Nine reactors have been committed and 21 more are either beginning construction or on the drawing boards.

The small, self-contained, portable units employ a unique core fabrication method with a radiation stabilized polyethylene moderator. The reactor resembles a liquid homogeneous type, but actually has a solid homogeneous core.

A lead shield provides protection against gamma rays. However, the shield comprises only 7500 lb of the over-all reactor weight.

Plastisol in Tumbler Nils Discoloring

Using tumbling barrels for polishing small parts has its advantages. But what happens when items for decorative purposes get discolored inside the barrel? The answer is this: line the barrel with a material that won't stain.

The Underwood typewriter plant in Hartford, Conn., was faced with a problem. Rubber-lined barrels were being used to polish typewriter keys, much to everyone's satisfaction. Then the firm switched to

Protecting tumbled parts is this plastisol barrel interior

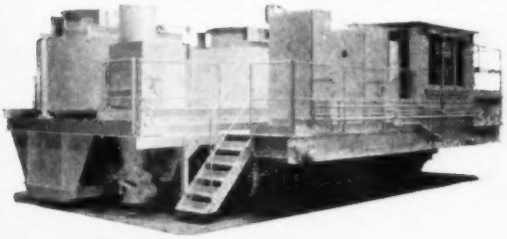
making white keys. These were yellowed in the polishing process because of contact with rubber lining.

Look High & Low — Company engineers experimented with several polishing methods to eliminate the

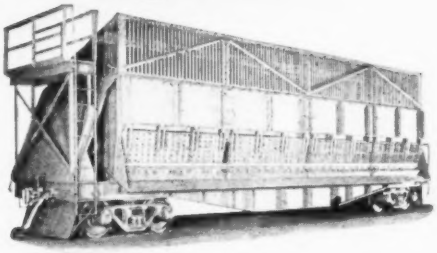
COAL TO COKE VIA ATLAS CARS

Making coke is a specialized business, and requires special equipment like the cars below. Coke plant operators prefer Atlas Cars because they are dependable.

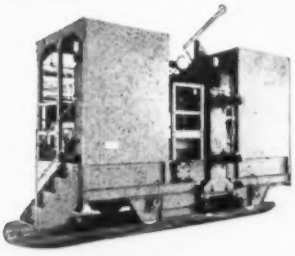
3 HOPPER COAL CHARGING CAR



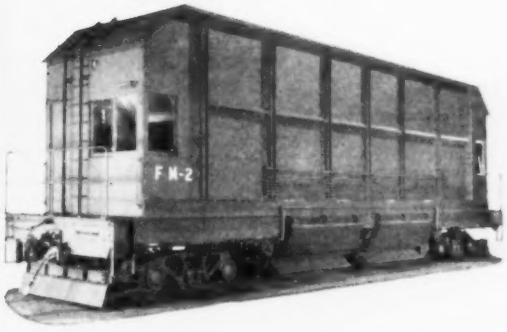
COKE QUENCHER



HYDRAULIC DOOR MACHINE



40-TON COKE TRANSFER CAR



THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

AGAIN! UDYLITE Hi-C SOLVES A PRODUCTION PROBLEM

Recently, a large supplier of nickel-plated parts was faced with the problem of doubling his production to meet the increased demands of his customers. There was no additional floor space for extra tanks or equipment.

The solution to the problem was Udylite's Hi-C Bright Nickel Process. By simply changing his 13,000 gallons of bright nickel solution to the new Udylite Hi-C Bright Nickel, the increased production was obtained.

Current densities were increased as the greater conductivity of the high chloride solution permitted higher current with no burning, even without increased agitation.

In addition, this user of Udylite Hi-C Bright Nickel Process benefited by better throwing power, which meant less nickel was used to obtain thickness requirements in recesses. Also, fewer anodes were needed since the Hi-C process provided the best anode corrosion of any nickel bath.

Why not find out what Udylite's exclusive Hi-C Bright Nickel Process can do for you? Write today for a new free folder describing Hi-C Processes for rack and barrel plating—or call your nearby Udylite representative.

THE Udylite CORPORATION DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

yellow. Finally, they had the barrels dip-coated with a plastisol made by Metal & Thermit Corp., New York. It worked. The plastisol provides a 100-pct solids, polyvinyl chloride lining that resists the reaction of a wide variety of chemicals.

The typewriter keys, which are tumbled with wood chips for several hours, are not affected by the new lining.

Any-size Box Cuts Packing Time

Want to speed your packaging operations? If so, maybe this is what you're looking for: an adjustable carton that fits practically any size item or items. The package has no top, no bottom, no lefts, no rights. In fact, it's not a carton at all when you start packing; however, it is when you finish.

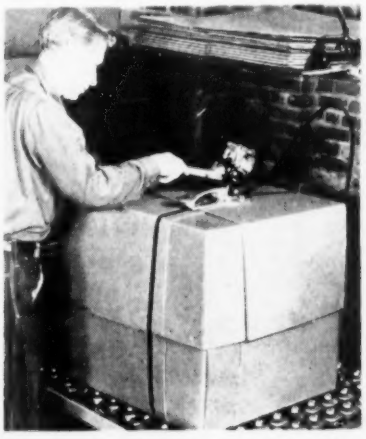
There's nothing complicated about constructing the units. You merely take several scored and

Start: workman assembles two of eight corner sections of box.

slotted fiberboard sections and make them up into corner sections. They overlap on each other to form an adjustable container. Actually, all you do is overpack a number of interior packages with four sections to form the bottom, and four sections for the top. Steel straps

hold the versatile pack together.

Almost No Limit—It is highly adjustable. With one piece of material, a square fiberboard section, you can pack just about any size product — within certain range limits, of course. Using these sections, you can pack any square item. For containers much longer



Finish: Worker straps-up carton with a steel strapping machine.

than they are wide, a rectangular section is used.

Basically, the setup consists of eight scored and slotted fiber sections overlapping each other. These adjust to various lengths, widths, and heights. The range is considerable. For instance, one of the stock sections made by one firm measures 36 x 36-in. It is scored and slotted at 14 in. This will overpack sizes from 22 x 22 x 14 in., to 38 x 38 x 24 in.

Saves Time — The packing method, developed by Signode Steel Strapping Co., Chicago, was introduced after a Cleveland firm became bogged down by export shipping problems. The company shipped several size packs in various boxes and crates. Using the old system, a packer would initially have to determine the approximate cube of the material. Then he had to go to the box department and have a special crate or box made up. Following this, he went back to the packing area again.

Sometimes, the packer would wait up to three hours to have his

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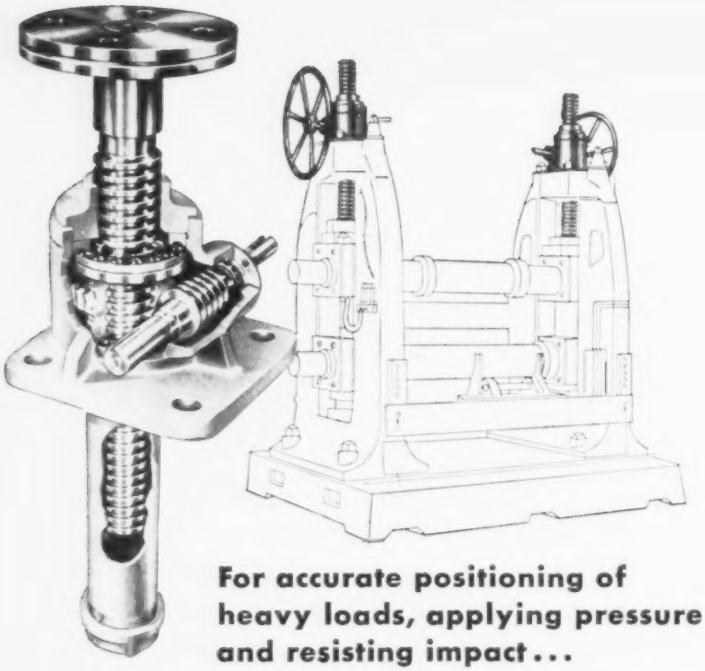

For accurate positioning of heavy loads, applying pressure and resisting impact...

Duff-Norton Worm Gear Jacks

Duff-Norton worm gear jacks provide a purely mechanical means for accurately positioning loads weighing up to several hundred tons and maintaining them indefinitely without creep. They may be incorporated into the design of a new piece of equipment, or installed in existing facilities to replace other positioning devices. They will operate in any position, and functioning as components of machinery or equipment, worm gear jacks can raise or lower loads, apply pressure, or resist impact.

Capacities range from five to 50 tons. When two or more are connected by means of shafting and mitre gear boxes to raise loads they lift in unison—even when the load is unevenly distributed. Worm gear jacks are available with standard raises up to 25 inches, and will maintain an exact raise through years of service without adjustment. Each of the six sizes has a standard worm gear ratio ranging between $6\frac{3}{4}$:1 and 32:1. They are made with either square or Acme threads, and give one inch raise for from 10 to 48 turns of the worm. Jacks are suitable for operation at ambient temperatures as high as 200°F.

Thousands of worm gear jacks are in use on feed tables, tube mills, welding positioners, pipe cut-off and threading machines, loading tables, rolling mills, conveyor lines, arbor presses and numerous other types of equipment. To learn how they can improve the performance of your equipment and save you money, write for bulletin AD-34-CC or ask for a Duff-Norton representative to call.

DUFF-NORTON **Duff-Norton Jacks**

DUFF-NORTON COMPANY

P. O. Box 1889 • Pittsburgh 30, Pennsylvania

COFFING HOIST DIVISION: Danville, Illinois

Ratchet Jacks, Screw Jacks, Hydraulic Jacks, Special Worm Gear Jacks, Ratchet Hoists, Electric Hoists, Load Binders, Spur Gear Hoists

box made up. Once back to the packing area, with his box, he would hope that the box size was correct, that he had supposed right. If the guess was a little on the large side, he could always fill the voids with scrap corrugated material or excelsior. If he figured the opposite, well, it could always stand in a corner somewhere until another order came along to fit it.

Shipper Is Careful — Naturally, most shippers were careful. By figuring too large, they kept the area clear of rejected cartons. This cost money in the long run though. Not even figuring the excelsior expense and the loss of recoverable scrap, the larger box cost money. This is simply because the larger the cube the higher the freight rate.

This particular company had to make up 800 different sizes of packages. One employee, dissatisfied with the old-fashioned way, hit upon the any-size carton idea. In spite of a lot of opposition from other packers, he was able to get out some test shipments. Response from overseas receivers proved favorable.

An additional advantage is this: pilferage rate is down; the packs are difficult to get into because of the steel straps.

Laps Carbide Inserts

A new lapping process produces perfectly flat, smooth finishes on throw-away carbide inserts. Now being used by Besly-Wells Corp., South Beloit, Ill., the technique provides a highly polished surface, so fine that two carbide inserts easily wring together. According to the firm, this gives inserts long tool life per cutting edge with little chipping and breakage.

Radio Aids Handling

Two way radios speed materials handling at Smith-Corona's Syracuse, N. Y. typewriter plant. The

firm mounts transmitters and receivers on its handcarts and forklift trucks. When the operator gets through a job or runs into an unexpected problem he uses the low power industrial radio to contact his dispatcher. General Electric Co. makes the equipment.

Small radio (left) provides fast contact with supervisors.

Researchers Find One Part in a Billion

Looking for a needle in a haystack? Or maybe a part in a billion? Impossible, you say. No so! Researchers at a large oil company's laboratory report that part of their routine is finding one part in a billion.

Used as a control in refining operations by the Gulf Oil Corp., the method involves spotting tiny amounts of certain metals which could poison platinum catalysts used in making fuels.

Spots Arsenic—The most harmful of these traces, arsenic, is destructive down to a few parts per billion. To detect this, the researchers combine new microchemical techniques with the old-fashioned Gutzeit police test for arsenic poisoning in humans. Here's how it works:

Organic matter in a crude oil sample is destroyed chemically and the residue put into solution. This is treated to produce arsine, a volatile compound of arsenic. The arsine, in turn, is reacted with a sensitized paper. This changes color according to the arsenic concentration.

Eye Can't Tell—Usually at this point, detectives using the Gutzeit method can judge visually if enough arsenic to poison humans is present. However, the human eye is far too inexact for part-in-a-billion recognition. The oil firm substitutes a spectrophotometer to determine the arsenic content at very low concentrations.

Similar techniques, each separately developed, are applied to detect traces of other materials harmful in larger quantities of one part in a million or half million.

How to Save On Cold Heading

When small parts makers want to turn out threaded parts at a rapid rate, at a low cost, they often use cold heading. In fact, they're using cold heading to the tune of about a billion bolts and cap screws annually.

Cold heading flows and compresses steel fibers, making the bolt or other part stronger than the blank from which it is made. Little or no material is cut away, of course; so there's little scrap loss. Unsound metal will usually open or distort when cold headed, so the process has built-in quality control.

Handles Many Items—Although the range of items that can be cold headed is very wide, good cold heading depends upon selecting the proper material, punch design, condition of machines and the skill of the operator. So emphasize engineers of Russel, Burdsall & Ward Bolt and Nut Co., Port Chester, N. Y.

Some useful rules of thumb can keep cold heading costs down, say

Hendrick Manufacturing Company, pioneer perforator, can really help designers improve product appearance and salability SOLD! No matter what the material you're using... be it metal, masonite, rubber, plastic, or insulated board, Hendrick's wide experience and manufacturing facilities can be of real help. You can select from hundreds of attractive designs in commercially rolled metals and gauges in round, square, diamond, hexagonal, or slotted, square, perforation in plain or Panel effects.

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Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring — Shur-Site Treads • Armorgrids • Hydro Dehazers • Petrochemical Column Internals

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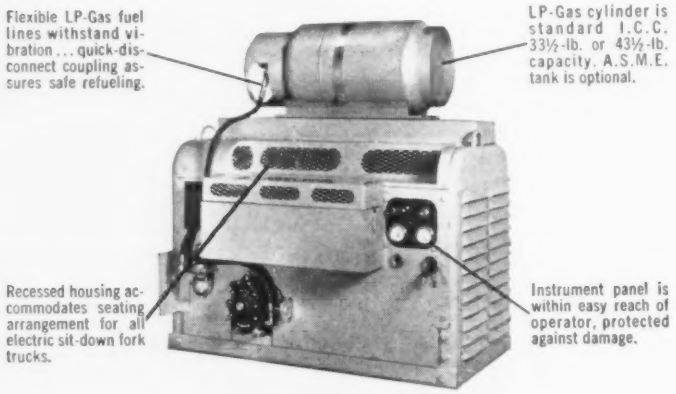
MODEL HA-3 FOR 4000-6000 LB. FORK TRUCKS

Now, get the advantages of full-time LPG-electric power for *any* electric, sit-down fork truck, regardless of make or model. Compact Ready-Power model HA-3 accommodates all seating arrangements . . . assures remarkably low-cost operation . . . minimizes objectionable fume problems. Compact LP-Gas cylinder is mounted on top of engine-generator housing for quick, easy interchangeability. Hinged cover and side plate give easy access to engine accessories; removable end plate permits service of generator. LP-Gas components are listed by Underwriters' Laboratories and comply with Factory Mutual recommendations. Write today for full information.


Flexible LP-Gas fuel lines withstand vibration . . . quick-disconnect coupling assures safe refueling.
LP-Gas cylinder is standard I.C.C. 33½-lb. or 43½-lb. capacity. A.S.M.E. tank is optional.
Recessed housing accommodates seating arrangement for all electric sit-down fork trucks.
Instrument panel is within easy reach of operator, protected against damage.

READY-POWER

The READY-POWER Co., 3822 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electic Power Units for Industrial Trucks

these fastener experts. Here are a few:

The maximum length of a cold headed part in today's machines is generally about 6 in. Maximum diameter depends upon the shape of the piece and location of the upset. For straight upsetting, a volume of material equal to 4½ diameters of the shank is about the limit. However, with transfer headers—using double extrusions and three blow headers or reheaders—26 diameters have been successfully controlled and upset.

Design Sets Number—The minimum number for an economical cold heading production run depends on design and, of course, the cost of alternate processing methods. Generally the cost of setting-up can be paid off by the faster speed of cold heading in one day's run—about 25,000 pieces for a fairly large part.

A wide variety of metals can be worked by cold heading. Cold

The range of parts made by cold heading is very broad.

heading steel becomes more expensive as carbon content increases—especially for complex shapes. It's best to limit carbon to 0.45. Many alloys are practical, including chrome nickel and chrome molybdenum. Nonferrous metals, such as silicon bronze, Monel, brass and copper are all good cold upsetting materials. Certain stainless steels

can be used, too. Materials which work harden rapidly are not practical for cold heading. However, the fastener engineers point out that users can select a cold heading material with almost any mechanical characteristics.

Takes Off-center Forms—Concentric formations are easier to handle than off-center or eccentric sections, they advise. However, many parts having concentric cams, serrations or sections are produced successfully in cold heading machines.

Sharp corners are difficult to fill. Generous radii should be allowed if possible. Oval or round shapes require less turning than square or rectangular shapes because the upset is usually made cylindrical in the header.

Think Twice — Hollow upsets generally result in more die maintenance and cracks tend to form around the edges of the recesses. The fastener experts advise manufacturers to think twice before setting up lettering or embossing operations. These can be very expensive.

Large sections with a flat underside are easier to remove from a die when there are concentric ridges on the underside, they point out. Long sections are more likely to distort if subsequent heat treatment is required.

Chuck Takes Big Work

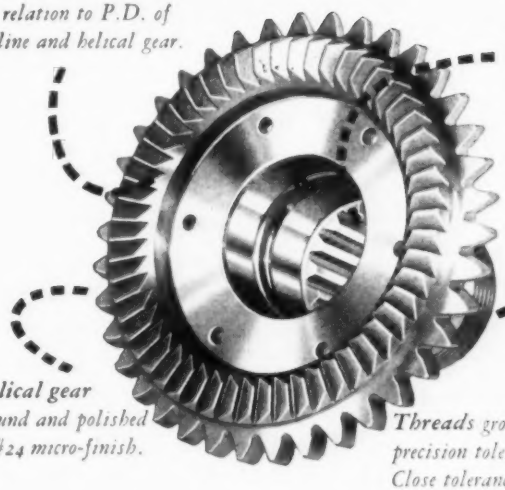
Dwarfing its little brothers is a big J-type lathe chuck. It is 66-in. in diam and is for use in machining jet engine components requiring considerable accuracy.

Manufactured by the Horton Chuck Div. of the Greenfield Tap & Die Corp., Windsor Locks, Conn., the chuck is substantially larger than the firm's standard line of 3-in. universal chucks.

Holding Features—The unit has a controlled centering pressure device which allows centering of large thin walled rings and parts without distortion.

Generated clutch held at close tolerance in relation to P.D. of spline and helical gear.

Involute spline, precision tolerance, uniform throughout, burr-free finish.



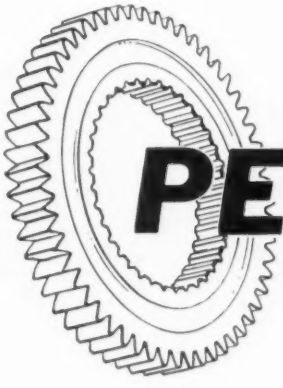
Helical gear ground and polished to #24 micro-finish.

Threads ground to class 4 precision tolerance. Close tolerance held between thread and P.D. of helical gear.

DON'T GAMBLE WITH GEAR PERFORMANCE

YOU know that gambling with gears can cost you money — production delays, costly rejects, failures in use. You don't want to take chances with your customers . . . they expect day-in, day-out performance from your machines. Your performance guarantee can be Perkins custom-cut gears . . . precision gears made to your exact specifications. Perkins' 52 years of gear-making know-how, extensive facilities and equipment, and rigid production controls assure uniform tolerances throughout . . .*plus* a consistent micro finish. You get perfect meshing and full capacity from every gear. Many leading manufacturers — Sikorsky, Stanley, Universal Winding, for example — rely on Perkins for top-quality gears, gears that cost less in the long run. Ask us to quote on your next gear requirement. Then judge for yourself.

YOURS ON REQUEST Folder illustrating gears Perkins has made — face gears, generated and curvic clutches; bevel, spiral, helical and spur gears; ratchets, sprockets and ground thread worms — from all materials. Includes Perkins facilities for producing various gear types and sizes. *Write today.*

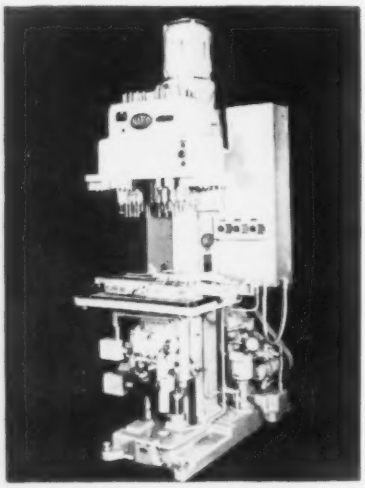


PERKINS
MACHINE AND GEAR CO.

Dept. 21, West Springfield, Mass.
Telephone: REpublic 7-4751

New Production Ideas

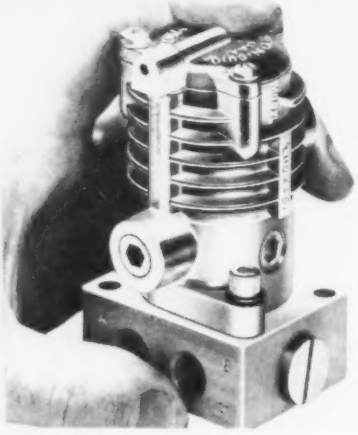
Equipment, Methods and Services



Machine Drills, Taps, Step Drills, Chamfers

New available with a pre-set selective cycle control and a straight-line indexing slide is this multiple-spindle drilling and tapping machine. This makes practical automated drilling and tapping even for small lot production of a wide variety of parts usually handled by gang drills. Thus, operators are freed for other duties and set-up times are decreased. It does away with single-purpose special machines and conserves floor space. In operation, the operator unloads the finished part, loads a new one and depresses the starting switch. The machine then goes through all operations and returns to the loading position. Over 100 combinations of operations are possible simply by setting selector dials. Machining functions available include: drill, tap, step drill, chamfer, countersink, counterbore, spotface and skip. Table movement in the machine's drilling cycle consists of rapid traverse up, feed up and rapid traverse down. (National Automatic Tool Co., Inc.)

For more data circle No. 43 on postcard, p. 146



Valve Controls Small Double-acting Cylinders

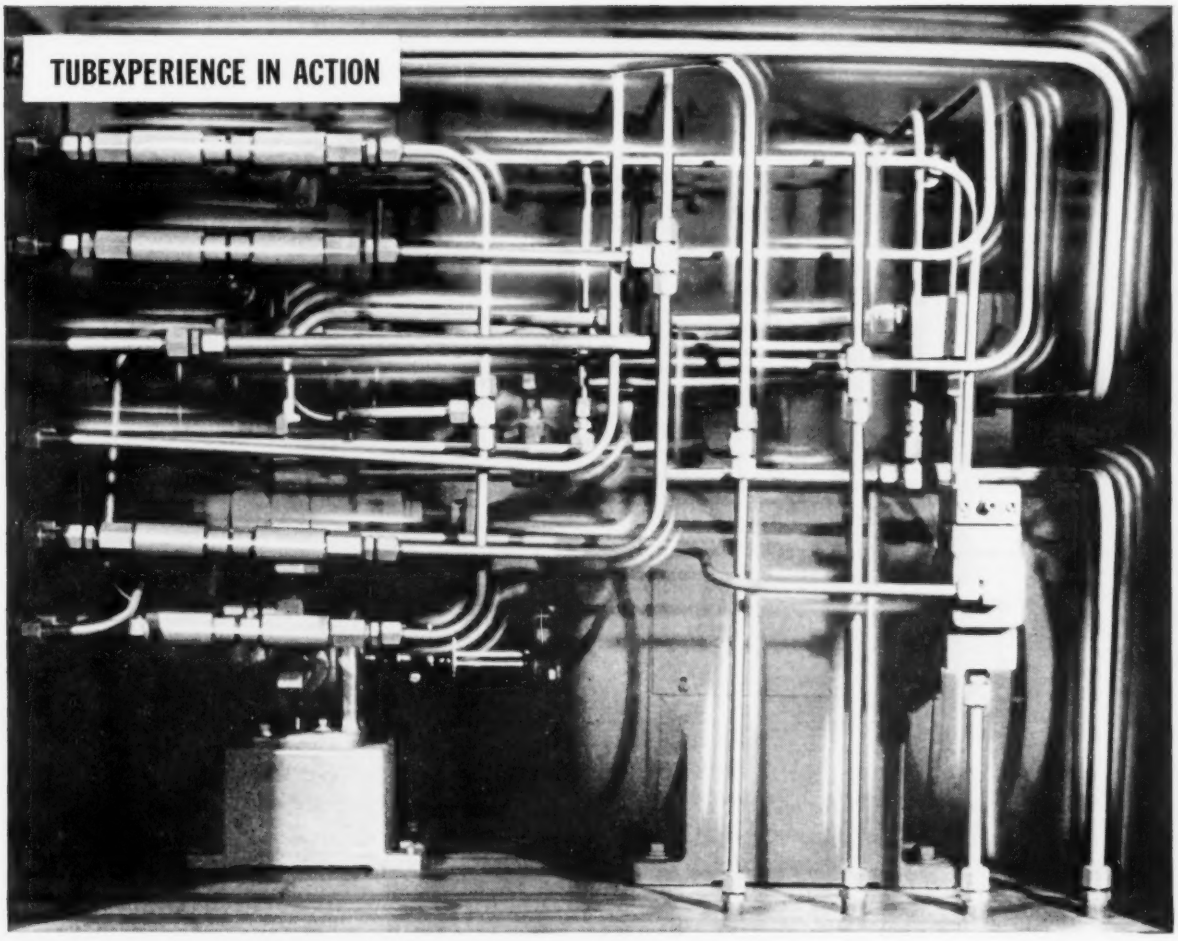
This miniaturized pilot-operated 4-way valve is recommended for control of small double-acting cylinders and similar devices. Of a single solenoid design, the valve is just 4-in. high; it weighs only 30 oz. The unit has three working parts. Four-way action is achieved with a single solenoid pilot and a pressure-balanced shuttle in the valve body. Extremely fast response and bubble-tight sealing are outstanding features, its maker says. Dependable performance and long life are claimed for the valve. Corrosion resistant materials are accredited with assuring this. The valve body is of anodized aluminum and moving parts are stainless steel, with Hycar seals. The solenoid pilot, with coils for ac or dc, any voltage, is interchangeable with standard pilots. It's built to JIC standards. Manual over-ride and an integral junction box are optional features available from the manufacturer. (Valvair Corp.)

For more data circle No. 44 on postcard, p. 146

Television Setups Serve Many Industrial Uses

Completely self-contained, this industrial television camera is a versatile unit. It requires no external supply or power control unit. The camera produces bright, clear pictures with light levels as low as 10 or 15 footcandles. It'll offer usable pictures with even less light. The basic camera measures 5 wide, 7½ high, 12-in. long. Weight is 12 lb. In addition, its maker has available a complete new line of closed-circuit industrial television equipment. This includes an eight and 17-in. video monitor (although both the firm's cameras are designed for use with a standard television receiver); lenses, etc. (Allen B. DuMont Laboratories, Inc.)

For more data circle No. 45 on postcard, p. 146



VIBRATION can murder hydraulic lines

Only tubing with high ductility and smooth, uniform surfaces can take this terrific punishment in its stride!

When big motors start delivering power, hydraulic lines go into their vibrating dance. Unless the lines are made from highly ductile material and have exceptionally smooth, uniform surfaces, the ceaseless, pounding vibration may actually cause cracks and ruptures.

Superior hydraulic tubing is available through leading warehouse distributors from coast to coast. Contact the one nearest you today for information—or get a free copy of Bulletin 39 by writing to Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

HERE'S WHY SUPERIOR (SAE) HYDRAULIC TUBING WILL GIVE YOU LONGER, MORE ECONOMICAL SERVICE

High ductility! *Furnished in dead-soft annealed temper, Superior hydraulic tubing flares easily, bends without pinching, can be readily fabricated for any hydraulic application.*

Non-aging steel! *All Superior hydraulic tubing is made of selected non-aging steel. It keeps its ductility, will not become brittle with age. Carbon content is limited to .12% maximum.*

Bright, smooth, clean! *Special processing gives Superior hydraulic tubing an unusually bright, smooth, clean finish on both OD and ID; reduces turbulence and pressure drop. Shipped with special rust preventive coating on both inside and outside surfaces.*

Fully tested! *And not mere random sample testing! Every length of Superior (SAE) hydraulic tubing is 100% hydrostatically tested at maximum working pressure—giving you realistic performance insurance.*

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ¾ in. OD—certain analyses in light walls up to 2½ in. OD

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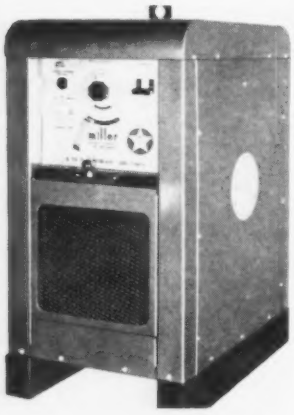
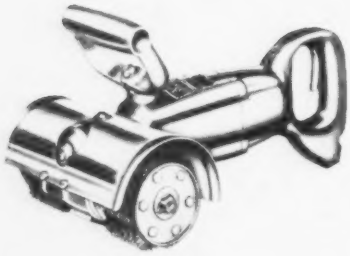


Welder Boasts a High Short Circuiting Current

Featuring a new transformer, this rectifier type direct current welder delivers considerable arc stability for high metal deposition with all electrodes in all positions. So says its maker. The welding unit features a new weld stabilized circuit and a completely sealed semi-metallic rectifier. According to the setup's manufacturer, the machine has an appreciably high short circuiting current. This means that it is possible to "pinch the arc" in vertical and overhead welding. The company that produces the new rectifier type dc welder is also currently making available all its models in the new style only. These include the firm's 200, 300, 400, 600 and duplex models. The new type units are some 4-in. deeper and weigh several pounds more than the company's earlier models. (Miller Electric Mfg. Co., Inc.)

For more data circle No. 46 on postcard, p. 146

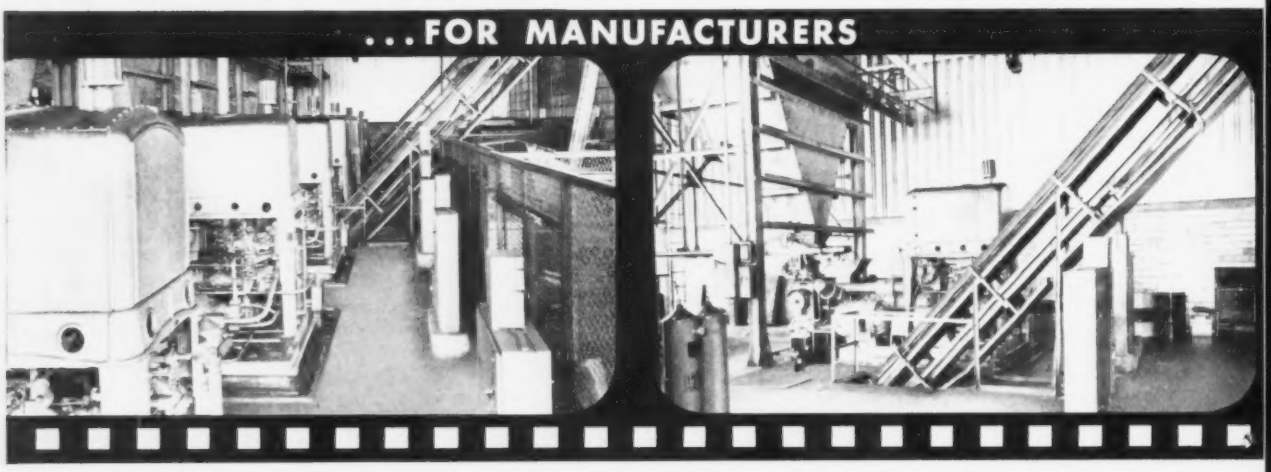


Cleaning Tool Removes Rust, Scale, Old Paint

Using a "floating rotor" principle, a pneumatic cleaning tool removes rust, scale, old paint and foreign accumulations, from iron, steel, brick and concrete surfaces. It has a rotor which floats on the spindle on which it is mounted. Therefore, any thrust which may be applied to the spindle does not affect the functioning of the rotor, since the rotor is a slip fit on the spindle. (Aurand Mfg. & Equipment Co.)

For more data circle No. 47 on postcard, p. 146

MILWAUKEE PRESSES convert machine shop scrap



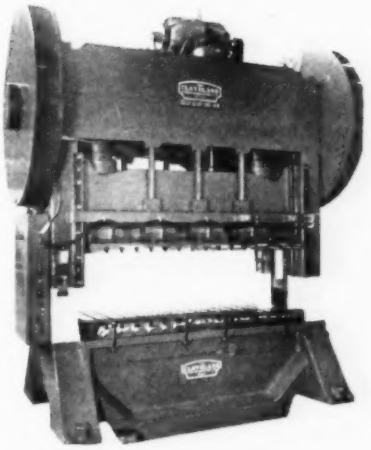
OVER 35,000 TONS OF SCRAP . . . VALUED AT MORE THAN $600,000 . . . RECLAIMED ANNUALLY AT FORD'S CLEVELAND ENGINE PLANTS

A battery of six MILWAUKEE Briquetting Presses effects substantial savings at Ford Motor Company's integrated engine plants and foundry in Cleveland, Ohio. Automatic in operation, these hydraulic presses convert bulk cast iron chips from the two engine plants into dense briquettes that are re-charged into the foundry cupolas.

This effective recovery and processing system assures maximum reclamation of valuable scrap . . . reduces dependence on outside sources. In addition, briquettes are easier to handle and require minimum storage space per ton.

7144-SI

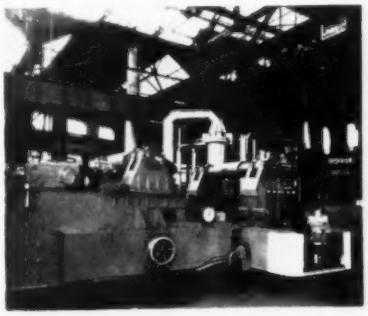
Presses Take Light Sheet to Heavy Plate



This 200-ton single-geared, double crank, straight sided press is equipped with twin drive and an electrically controlled heavy-duty drum-type friction clutch with an air brake. The flywheel has an auxiliary air brake to enable a quick stop when power is suddenly shut off. The press has an 8-in. stroke, 10-in. adjustment of the slide, shut height of 30-in., slide or plunger face of 48 x 96-in. and a 33 x 81-in. bed opening. The press comes in 75, 90, 110, 120, 150, 200, 250 and 350-ton capacity models. It can be modified in respect to die space, stroke, adjustment, bed area, etc. Actually, it can come in an almost unlimited number of combinations. The variety of sizes and capacities in which these models are available, allows any thickness of material from light sheet metal to heavy steel plate. Twin drive is used exclusively on the large models. (Cleveland Punch & Shear Works Co.)

For more data circle No. 48 on postcard, p. 146

Forging Manipulator Is Hydraulically Run

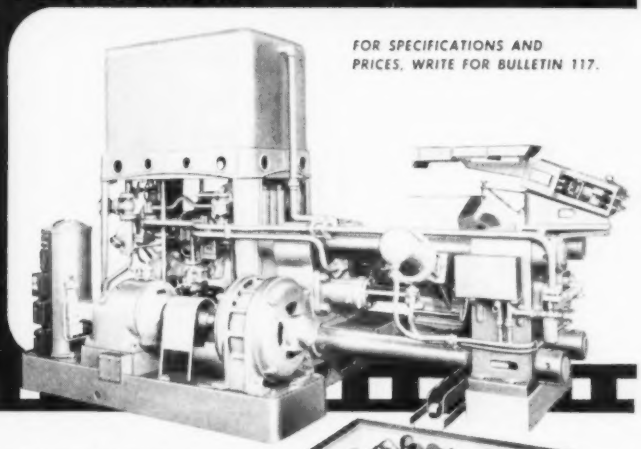


All movements are done hydralically on this forging manipulator. Unlike many domestic handlers, this German-made unit doesn't employ electric or semi-hydraulic manipulator drive systems. It's fully hydraulic. Depending on the size of the manipulator, one or two pressure pumps driven by electric motors deliver water to an accumulator at a pressure of 1420 psi. The manipulators are currently available in standard sizes, ranging from a carrying capacity of 5500 lb to 220,000 lb. (Industrial Equipment Division, Kurt Orban Company, Inc.)

For more data circle No. 49 on postcard, p. 146

into savings and extra profits . . . *automatically!*

. . . FOR SCRAP PROCESSORS



FOR SPECIFICATIONS AND PRICES, WRITE FOR BULLETIN 117.

BRIQUETTED CHIPS AND TURNING HAVE INCREASED PROFIT MARGIN OF 30% OR MORE PER TON

Classified as high-grade scrap, briquettes mean extra income. The increased value, depending upon type of scrap converted, ranges up to *$20.00 or more per ton.*

Scrap processors are using MILWAUKEE presses to expand operations at surprisingly low cost. Many amortize the initial investment within the first year.

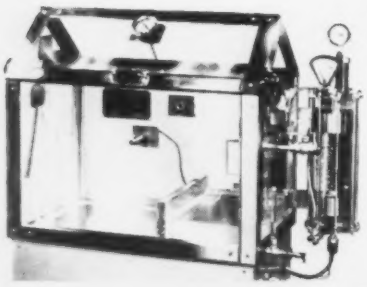
Four press models are available . . . capacities range up to 3½ tons per hour.

WORLD'S LARGEST SUPPLIERS OF MOLDING MACHINES

SPO INCORPORATED

Milwaukee Division

6460 Grand Division Avenue • Cleveland 25, Ohio



Chamber Makes Environmental Salt Spray Tests

This transparent salt spray test chamber helps researchers determine salt fog corrosion resistance of materials and components. The chamber meets the requirements of military specifications. Operation of the testing unit is simple. The chamber, when connected to a low pressure air supply, produces a fine mist, and reaches test conditions within 15 minutes. Specimens to be tested are then suspended from hanger rods which are supplied with the chamber. Bulkier components can be placed on the chamber's bottom supported by rods to avoid contact with the salt solution. All-Lucite construction allows complete visibility of the test in progress, from all angles. Temperature controllers and indicators are part of both the chamber and the air saturation tower. Dimensions of the chamber are 20 x 20 x 20-in. (Associated Testing Laboratories).

For more data circle No. 50 on postcard, p. 146

Leak Detector

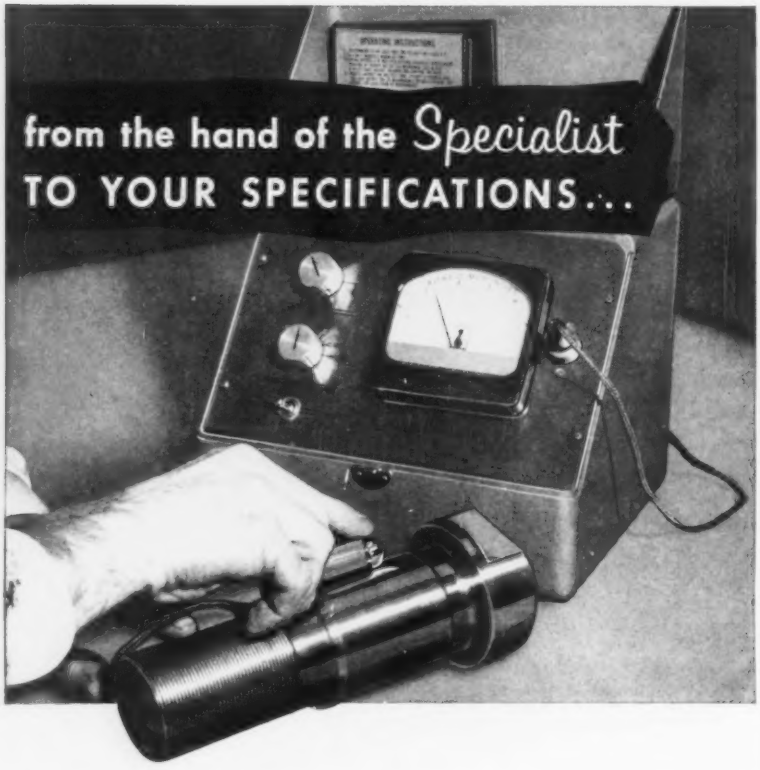
A leak detector detects and locates a leak so small that it admits less than 2 cu in. of gas per year. The halogen sensitive instrument locates leaks in high vacuum, pressure and other process equipment. It also serves as a quality control instrument in leak testing manufactured items. The unit connects to the system or part under test which is then evacuated with a mechanical vacuum pump. When a pressure of 80 to 200 microns is attained, the outside of the part is blanketed with a tracer gas. Easily available, low cost Freon-12 is used. If a leak is indicated, further probing with a fine stream of gas locates the leak with pinpoint accuracy. (NRC Equipment Corp.)

For more data circle No. 51 on postcard, p. 146

Storage Racks

Storage racks are now completely adjustable without bolting or unbolting. The unit's stringers move quickly up or down a special formed post and lock themselves in place. Over 800 different sizes and capacity variations can be made from five basic parts. (American Metal Products Co.)

For more data circle No. 52 on postcard, p. 146



ERIE Bolts • Studs • Cap Screws • Nuts
In Alloys • Stainless • Carbon • Bronze

The reading on this Surfindicator measures more than just the fine finish on this special bolt. It measures the result of the precision craftsmanship your own specifications receive at Erie Bolt & Nut Company. Producing a wide variety of special fasteners to resist corrosion, extremes in temperature and tensile stresses as specified is our exclusive job . . . has been for almost half a century.

Send us your specifications for prompt estimate.

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RIC
REPUBLIC INDUSTRIAL CORPORATION

ERIE BOLT & NUT CO.
Erie, Pennsylvania
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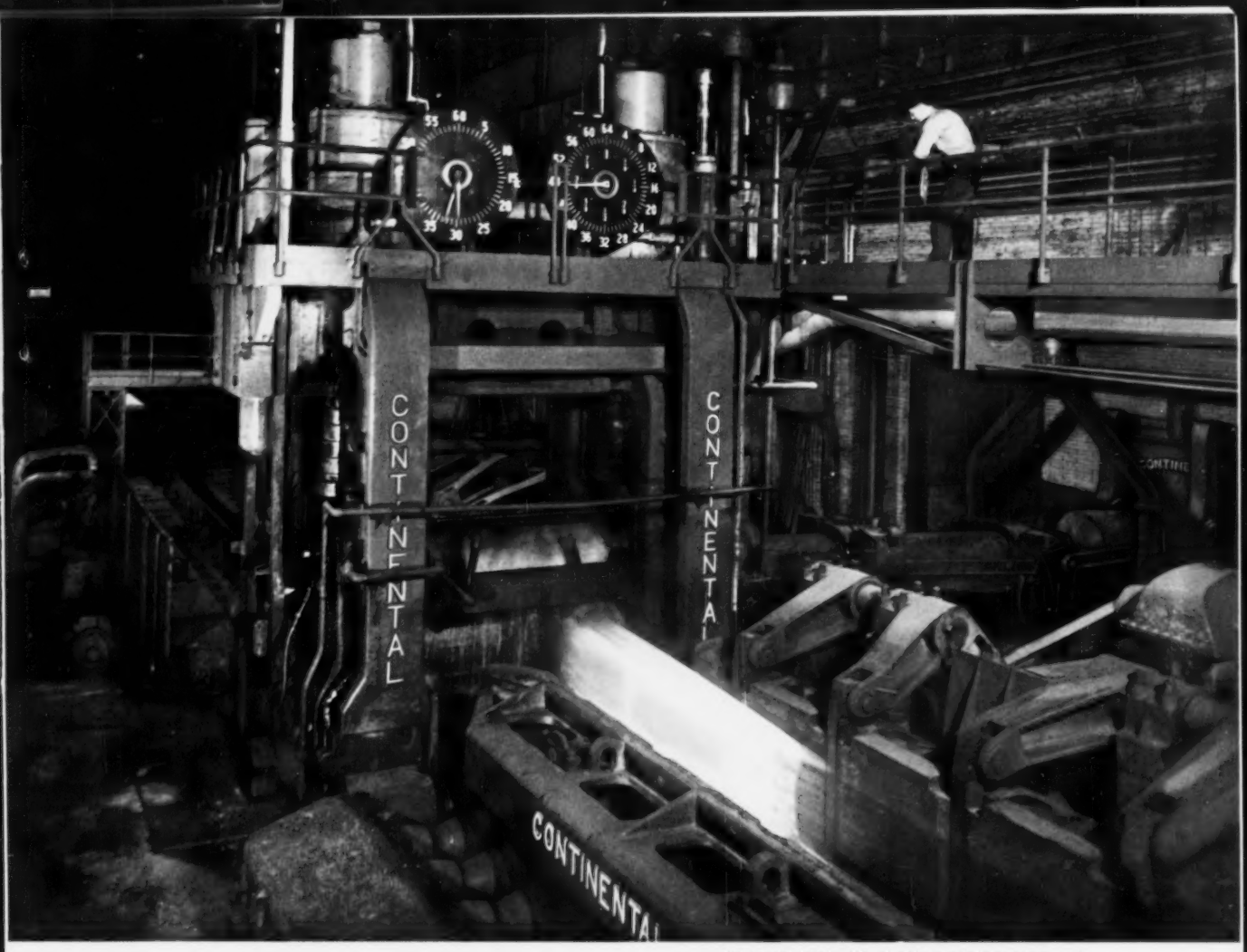


46-inch high lift slabbing-blooming mill

BLAW-KNOX

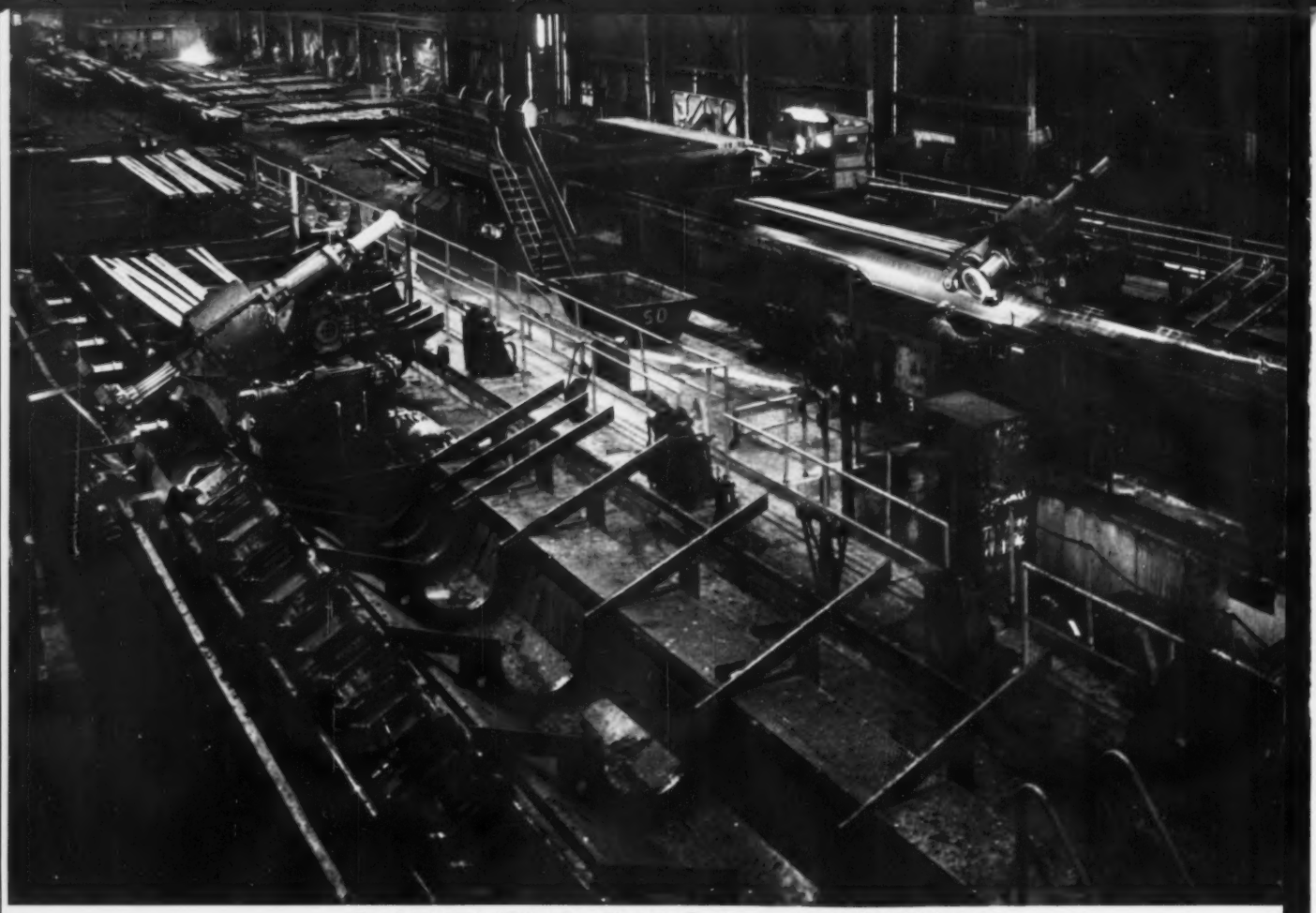
SLABBING-BLOOMING MILLS

Blaw-Knox designs and builds slabbing-blooming mills in a complete range of sizes in high-lift and universal types. Other Blaw-Knox equipment for metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania



The Continental Billet Conditioning System provides straight through work flow from raw billet inspection to chipping and discharge

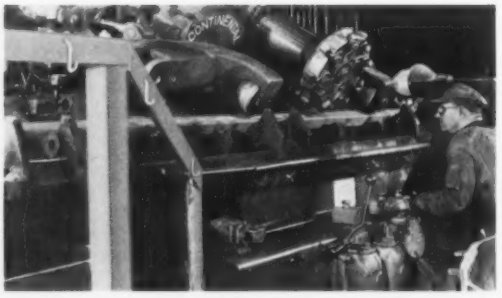
BLAW-KNOX Billet Chipper

increases chipping production, cuts handling time

The Blaw-Knox Continental Chipper with auxiliary equipment is a complete mechanical system for unscrambling or sorting bundles, inspecting and chipping billets. This integrated system has demonstrated in-service cost savings over manual conditioning. It represents a wise investment in long range modernization programs for conditioning for subsequent rolling in merchant and bar mill operations.

Product quality improvement is immediate, positive. Precise chipping is accomplished by a non-traveling cutter head under which the billet moves in a fashion similar to a milling machine. All chipping is done at close range, immediately in front of the operator. This single operator, located in front of the cutter head controls the entire operation including all material handling.

The chipper is equipped with special interlocking devices which eliminate unsafe operation.



Usual chipping bay hazards such as high pressure air lines, improperly handled chisels, and flying chips are removed. The Continental Chipper accommodates billets up to 30 feet in all merchant and bar mill sizes.

BLAW-KNOX

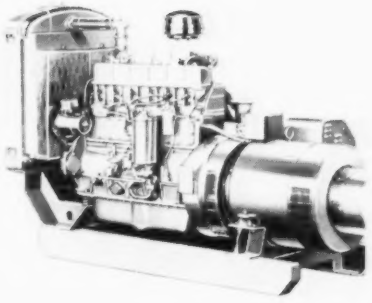
BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Electric Plant Delivers Power When Needed

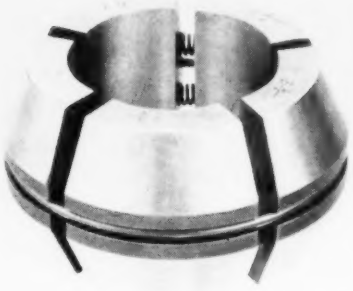
Gasoline powered, this new model 50-kw electric plant can be started by remote control. The power generator is recommended by its manufacturer for situations and applications where an outside electrical supply might fail or where the need for an emergency power unit is an absolute necessity. The generator can be kept as a reserve unit ready to deliver standby power whenever needed. Featuring a six-cylinder liquid-cooled engine, the setup develops 115-hp at 1800 rpm. The equipment also contains a 60-cycle rotating field generator. Automatic voltage regulation is standard. The unit is available in 120/208, 115/230 and 230-volt models, according to its manufacturer. (Kohler Co.)

For more data circle No. 53 on postcard, p. 146



Cast Iron Collets

In order to prevent or reduce scratches and mars on stock being cut-off on automatic cutting-off machines, a firm is now producing fine grain cast iron collets and feed rolls. The collets are divided into five moving segments. They provide positive gripping of stock that may be slightly out of round. These new collets do not mark or scratch the work as much as collets made of hardened steel. They last as long or longer than collets made of hardened steel, their maker says. (Modern Machine Tool Co.)



For more data circle No. 54 on postcard, p. 146

Lead Anode

Widely used in chromium plating, anodizing, electropickling, electrogalvanizing, and lead or lead alloy plating, special anodes are now available from one maker in all sizes or shapes of any lead alloy desired. The special designs complement standard styles of flat, sawtooth, round, and herringbone anodes. (Heil Process Equipment Corp.)

For more data circle No. 55 on postcard, p. 146

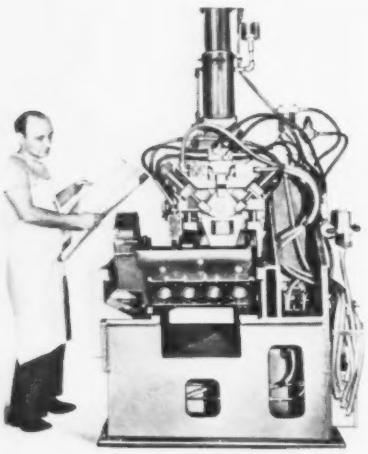
In a single year, over a quarter million pounds of tools and gages were heat treated in this high speed Ajax salt bath furnace. Rapid, uniform, closely-controlled heating assures hardness within 1½ points Rc on a production basis.

THE BEST WAY TO HARDEN HIGH-SPEED STEELS

Any one of the following advantages is, in itself, enough to warrant the choice of Ajax Electric Salt Bath Furnaces for hardening tools or parts—whether they be of carbon, alloy, stainless, molybdenum, or high-speed chromium steel. Add them all together and it's easy to understand the almost universal preference for salt baths for this critical work!

- **Work is free of scale, decarb, pitting or other surface defects.**
- **Heating cycles are from 4 to 6 times faster than in atmosphere or radiant furnaces.** *(You get more production in less time, in less floor space!)*
- **Warpage, distortion or loss of size, even in long or unusually-shaped tools, are negligible.** *(Finish grinding can usually be completed before hardening. Because their is no oxidation, cutting tools retain a keen edge.)*
- **Heat treating results are exceptionally accurate and uniform—and they are fully and easily reproducible.**
- **Long-life ceramic pots and exclusive Ajax Removable Submerged Electrodes assure minimum maintenance cost.**
- **No skilled labor is required.**

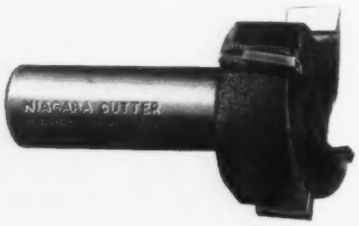
AJAX ELECTRIC COMPANY
904 Frankford Ave., Philadelphia 23, Pa.
Associates: Ajax Engineering Corp., Ajax Electrothermic Corp.



Automatic Machines Mark Production Parts

Numerical control of production parts in automated production-assembly lines is possible with new automatic marking machines. One such unit marks consecutive serial numbers on engine cylinder blocks. This number identifies each block with its own corresponding bore size so that subsequent operations and assembly can be successfully coordinated. This particular unit marks from one to four-digit numbers 5/16-in. in size to a depth of 1/64-in. at a production rate of 968 parts per hour. In other designs, marking capacity of the machines range from one digit to 10-digit numbers. Marking speed of the machines can meet virtually any production requirement. Variable marking depths range from a kiss impression to as deep as 1/32-in. This may be maintained and controlled within ±0.001-in. In some cases, deeper impressions are particularly important. (New Method Steel Stamps, Inc.)

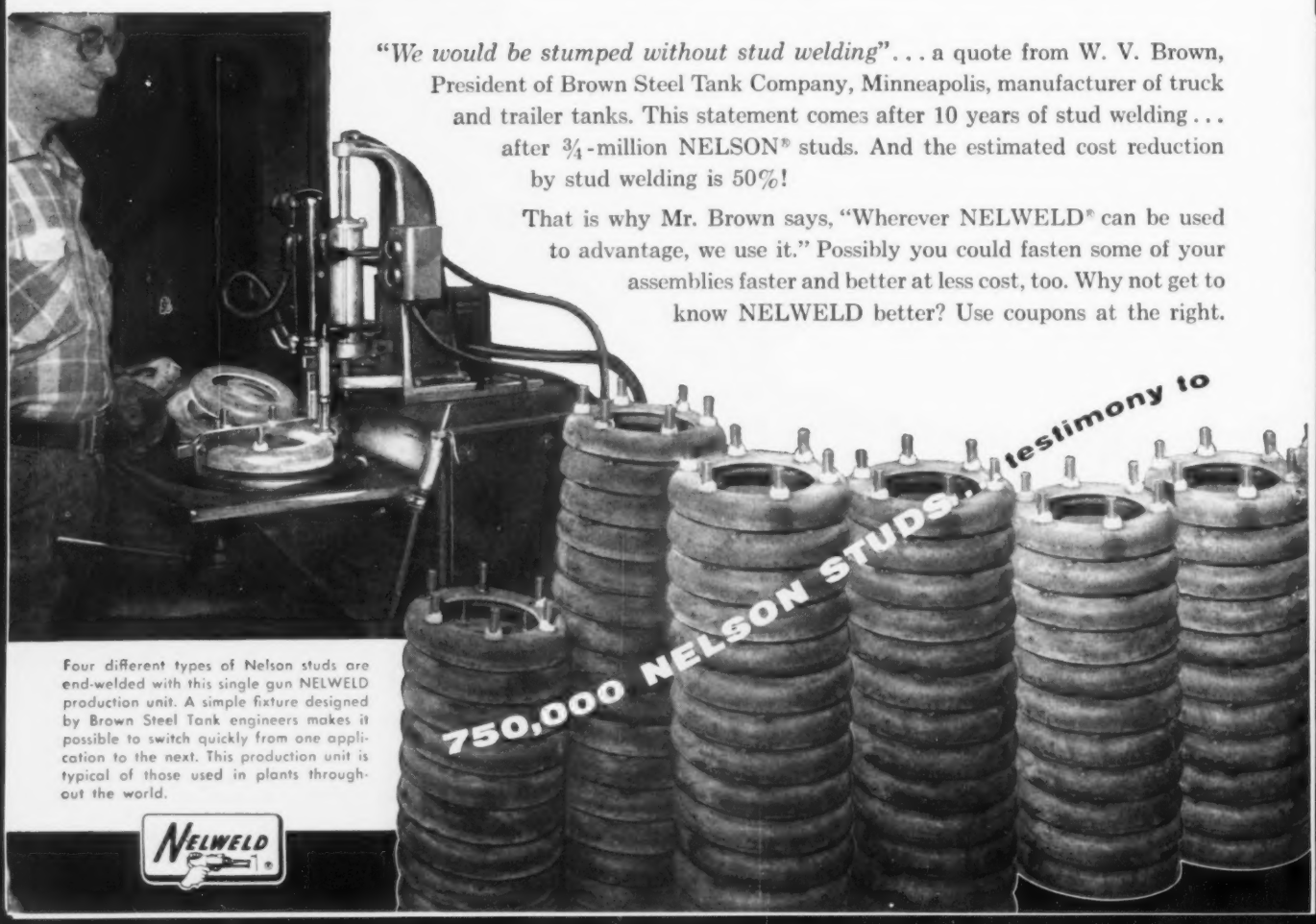
For more data circle No. 56 on postcard, p. 146



Face Mills Boost Parts Production

Recently developed is a new line of shank type carbide face mills which increase output of aluminum, brass and steel parts on popular size Bridgeport type vertical milling machines. These face mills are offered in 14 standard models with 1½, 2 and 2½-in. diam cutters with integral ¾-in. straight shanks and over-all lengths of 2⅞ in., according to the manufacturer. (Niagara Cutter Div., Bollier-Damerell, Inc.)

For more data circle No. 57 on postcard, p. 146



"We would be stumped without stud welding"... a quote from W. V. Brown, President of Brown Steel Tank Company, Minneapolis, manufacturer of truck and trailer tanks. This statement comes after 10 years of stud welding... after ¾-million NELSON® studs. And the estimated cost reduction by stud welding is 50%!

That is why Mr. Brown says, "Wherever NELWELD® can be used to advantage, we use it." Possibly you could fasten some of your assemblies faster and better at less cost, too. Why not get to know NELWELD better? Use coupons at the right.

Four different types of Nelson studs are end-welded with this single gun NELWELD production unit. A simple fixture designed by Brown Steel Tank engineers makes it possible to switch quickly from one application to the next. This production unit is typical of those used in plants throughout the world.

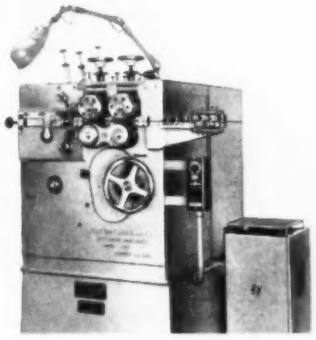
NELWELD®

Two Units Provide Power for Fillerarc Welding

Two new welding power sources are designed specifically for consumable electrodes gas shielded welding. Both the constant arc length and the constant voltage motor generators are rated 450-amp, 60 cycles. Two-high stacking of the units makes possible considerable floor space savings. Other features both have are: redesigned fan and baffled air ducts for reduced noise levels; complete phase insulation of motor startors for increased life; oversized sealed bearings; and constant pressure brushes, for correct settings. Four one-inch tie rods connect the bearing housing, magnet frame and fan housing in an accurate, rigid alignment. All control components are easily accessible by removing the top cover. The constant arc length welder, with a rising volt-ampere characteristic, virtually eliminates burn-back and stubbing. (General Electric Co.)

For more data circle No. 58 on postcard, p. 146

Spring Coiler Allows Rapid, Accurate Feeding



Employing a unique escapement idea, this universal spring coiling unit is for use with very accurate, high speed spring production setups. It allows long, accurately measured feeds. A new holding mechanism makes possible more than one revolution of the feed roll per spring. Cams which raise and lower the feed rolls assure measurement accuracy. A key feature of the machine is that the wire feed does not vary with an increase in speed. Feed ranges beyond standard limitations are accomplished by a feed cycling arrangement along with continuous coiling and manual cutter control. (Sleeper & Hartley, Inc.)

For more data circle No. 59 on postcard, p. 146

Tank drain sumps with NELSON threaded studs are hand-welded to truck tank.

NELSON granular flux filled studs of various types are used in the fabrication of Brown truck tanks: (1) Six threaded studs end-welded to drain sumps, (2) threaded stud centered in fill cap, (3) fill cap neck with four hinge studs, (4) square studs on door lock handles.

50% cost reduction, leak-proof tanks

COUPON

Attach to your company letterhead and mail to:

NELSON STUD WELDING
LORAIN, OHIO

Check here ○ if you would like us to send you a folder of cost-saving NELWELD applications.

COUPON

Attach to your company letterhead and mail to:

NELSON STUD WELDING
LORAIN, OHIO

Check here ○ if you would like to receive details on how to enter the $1500 GREGORY AWARD COMPETITION for the most significant contribution in the field of stud welding.

COUPON

Attach to your company letterhead and mail to:

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LORAIN, OHIO

Check here ○ if you would like a free subscription to the NELWELDER, industry's magazine of cost-saving ideas based on stud welding.

NELSON STUD WELDING . . . *Division of Gregory Industries, Inc., Lorain, Ohio*

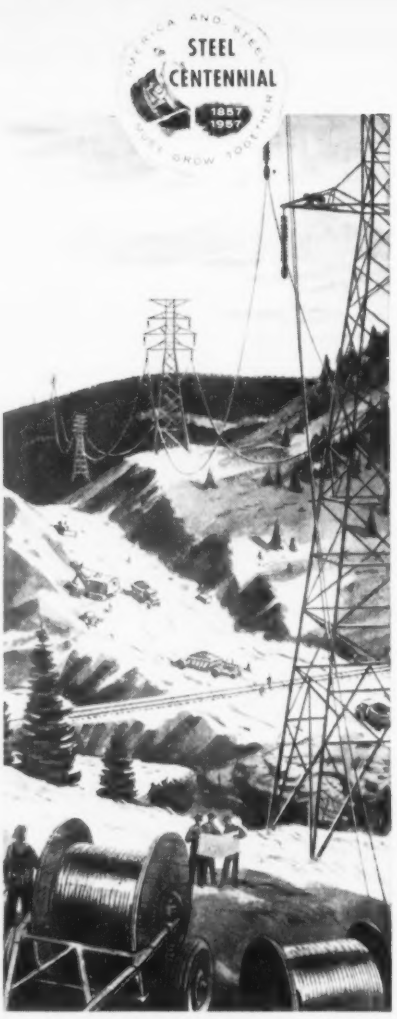
The PROOF of DSC STEEL is in its PERFORMANCE

for example

Here are Overall Job-Performance Scores of DSC ACSR* Core Wire

For 1956 . . . 99.784%

For 1955 . . . 99.740%



Courtesy Reynolds Metals Company, Louisville, Ky.

This information is of intimate interest to perhaps not more than a dozen or so users of ACSR wire in the whole USA and Canada.

But it may be of interest to steel users generally because the *STEELMANSHIP* that is responsible for this showing, is the same that goes into all DSC products.

***WHAT DSC ACSR WIRE IS**—It is a hard drawn, high carbon (range 0.50 to 0.75%), high tensile (175,000 psi to 190,000 psi minimum depending on gauge), heavy zinc-coated Specialty Wire produced at our Portsmouth Division. It is used to strengthen aluminum cable construction strung over long spans. It must meet extremely exacting acceptance tests for physical properties and dimensional accuracy, weight of coating and surface condition. Quality consistency is a "must"—for efficient stranding by the cable fabricator.

For the cable fabricator ACSR means Aluminum Conductors, Steel Reinforced.

For the wire producer, it means Aluminum Cable Strand Reinforcement.

WHAT THE RECORD MEANS—These job-performance records are significant in that they are based not on isolated case histories but on total ACSR wire shipments to all customers for two consecutive years. The customers are among the top-ranking aluminum cable manufacturers. These shipments amounted to millions of pounds. The percentages show that out of every 100,000 pounds shipped, 99,784 pounds met all acceptance tests during 1956; 99,740 pounds, the year before.

You may never have occasion to buy a pound of ACSR wire. On the other hand, we would appreciate the chance to prove to you that other DSC wire products, including wire rods, as well as DSC sheet and strip, offer you the same kind of on-the-job performance.

Call us . . . soon?

Customer Satisfaction Is Our Business

DSC MILLS AND PRODUCTS

PORTSMOUTH DIVISION, PORTSMOUTH, O.

Coke • Coal Chemicals • Pig Iron
Basic OH Steel Ingots • Blooms • Slabs • Billets • Rods
Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon
Manufacturers' Wire • High Carbon Specialty Wire • Aluminum Cable Strand Reinforcement • Rope Wire • Tire Bead Wire • Welded Wire Fabric

MILL DIVISION: DETROIT, MICH., HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

DETROIT DSC STEEL

DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

CUSTOMER "REP" OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio., Dayton, Ohio., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., Milwaukee, Wis., New York, St. Louis, Toledo, Worcester, Mass.

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The Iron Age Summary

Inventory Cuts Plague Mills

Some steel executives say inventory cutbacks will be a problem for balance of the year.

Revival in metalworking activity in fourth quarter expected to reverse inventory trend.

Inventory Outlook — Steel users may be cutting back on inventories for the rest of the year. At least that's the way some mills are beginning to size up the market. These mills say their customers' stocks of steel and finished products made of steel are still high. They don't look for a bottoming out on inventory correction until the fourth quarter.

Comeback Prediction—The dismal outlook for July is pointed to as proof of the pudding. Unless there's a sudden change of heart on the part of many buyers, July output will go into the record as one of the lowest in several years. Vacations and maintenance slowdowns will drag down July production nearly as much as customer complacency.

The inventory problem is expected to fade out of the picture in fourth quarter. By that time, automotive and other major users will be back into the market. The fourth quarter upsurge in metalworking activity will reverse the trend and swing the pendulum from inventory cutbacks to inventory buildups in many industries. The auto companies already have placed trial orders for new model production.

Current Market — Meanwhile, steel companies are supporting current output with incoming orders and backlogs. For some mills, the strong products — plates, structurals, and seamless pipe — are holding operating rates at high levels. Mills heavy on sheet and strip capacity are bearing the brunt of the easier market.

Steel operations in June may be a few points better than in May. This is a reflection of price hedging by some users who are pushing the mills for delivery of July orders in June. Buttweld pipe mills are under particularly heavy pressure. This moving up of delivery dates is another reason why July business will be slow.

Behind Mill Optimism — The looked-for comeback in fourth quarter is more than wishful thinking. For the last several years, the last four months of the year have been exceptionally strong for metalworking. For this reason, the mills expect a strong upsurge of orders by mid-September. These orders will be reflected in shipments for October and subsequent months.

Iron and steel scrap prices moved still higher this week. The mills apparently are straining to lay in a good supply of the better grades of scrap. A strong export market is another factor.

Impact On Prices — The higher cost of scrap will give the mills another selling point when they get around to raising steel prices.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,266	2,240	2,164	2,375
Ingot Index				
(1947-1949=100)	141.0	139.4	134.6	147.9
Operating Rates				
Chicago	86.0	88.0*	82.0	100.0
Pittsburgh	89.0	88.0*	90.0	96.0
Philadelphia	102.0	102.0*	101.0	102.0
Valley	74.0	72.0*	79.0	97.0
West	102.0	100.0*	101.0	99.0
Buffalo	102.0	95.0	85.5	105.0
Cleveland	88.0	88.0*	81.5	99.5
Detroit	100.0	98.0	85.0	99.0
S. Ohio River	90.0	89.0*	77.0	90.0
South	93.0	93.0	94.0	23.5
Upper Ohio R.	85.0	92.5*	85.0	103.0
St. Louis	84.0	89.5	85.0	102.0
Northeast	66.5	66.5	66.5	80.0
Aggregate	88.5	87.5	84.5	96.5

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.670	5.670	5.670	5.179
Pig Iron (Gross ton)	$64.56	$64.56	$64.56	$60.29
Scrap, No. 1 hvy (Gross ton)	$54.83	$50.83	$45.83	$44.83
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	25.90
Copper, electrolytic	32.00	32.00	32.00	46.00
Lead, St. Louis	13.80	14.80	15.30	15.80
Magnesium ingot	36.00	36.00	36.00	34.50
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	98.375	98.375	97.625	94.00
Zinc, E. St. Louis	11.00	11.50	11.50	13.50

*Revised

Motor Buys Are at Their Best

Even if you are not in the market now for an electric motor, you might do well to order.

Prices probably will go up before the year is out. Fast delivery available now.

■ If you're in the market for a motor, now's probably the ideal time to buy. The reasons: Delivery picture is good for most types; prices are due to go up in the next six months; new motor lines are offering power in more compact packages.

In the integral horsepower range, sales of standard ac models are off 25-50 pct from the early months of last year. As a result, manufacturers can make delivery out of stock. The heavier integral horsepower units had escaped the general easing but a recent sales lag has dropped lead times of motors over 100 hp to normal.

Special Winding Trend—Sales of special purpose ac motors have held up fairly well; one manufacturer feels there is a trend toward more special windings; special flanges and special threading. But delivery times are good for this group also. They range from six weeks down to one week. Manufacturers have short backlogs and ample material stocks. They remind purchasing agents, however, that special motor specifications carry a price premium, create service and delivery problems.

Sales of dc motors and dc generators are off somewhat but manufacturing cycles are longer than for ac units. Process time at one plant is 8 to 10 weeks. Because of this, delivery times are longer.

Packages Popular — In recent years there has been a marked increase in the use of motor generator package sets. These come in compact cabinets with all controls included. They eliminate the need for putting together a control system piecemeal. Package sets are available in standard designs from any one manufacturer but are not standardized on an industry wide basis. Parts for different make systems are not necessarily interchangeable.

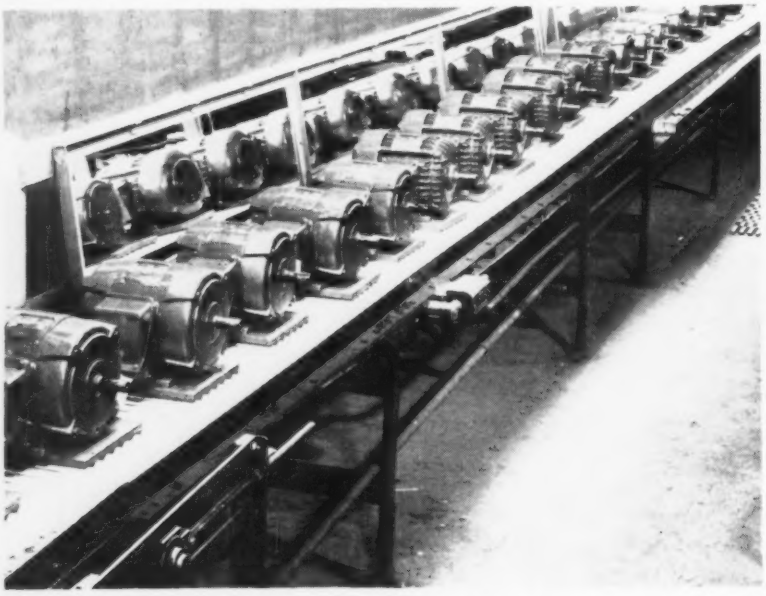
Speed variation can be provided with ac motors through mechanical or hydraulic systems and also by variable shaft speeds. The variation of ac motor speed is confined to definite steps; there is not the full flexibility of dc systems. However, ac motors are less expensive than dc and are generally recommended when they can do the job.

A Price Check—Prices of ac motors to 1800 rpm are roughly $20 per hp at 5 hp; $15 per hp at 10 hp; and $10 per hp at 20 hp. Prices of dc motors with the same speed ratings are $95 per hp at 5 hp; $66 per hp at 10 hp; $46 per hp at 20 hp. Price per unit of power tends to decrease as the motor gets larger but the rate of decrease levels off about 20 hp as production volume drops.

In both ac and dc motors, revised standards of National Electrical Manufacturers Assn. have enabled makers to take advantage of new materials and designs in reducing the size of motors. New models are about one frame size smaller for the same power rating.

Prices to Go Up—Prices of big motors will probably go up in the fall, though not as much as last year's 10 pct hike. And a general price rise can also be expected for fractional hp motors.

On spare parts, electrical people are doing a good job finding replacements for motors as old as 45 years.



READY FOR USE: At the end of the production line, these redesigned Westinghouse motors will meet early delivery dates.

Hedge Buying Now Will Hurt July

Third quarter ordering may suffer because customers push up tonnages to June in effort to beat price increases.

July odds-on favorite to win title of slowest month.

▪ Limited hedge buying by customers out to beat price increases has apparently sealed July's doom as low sales month of the year.

Whatever efforts buyers are making to stock up before July 1—and they aren't extensive — are often coming at the expense of July tonnages. This transferring of orders is bound to hurt July sales totals for all products except plates, shapes and pipe. And coming in a month when the normal seasonal factors of heat, vacations, and maintenance shutdowns take their toll, it adds up to sales stagnation.

Getting It Out—Some customer enthusiasm for June deliveries of buttweld pipe, for example, is being greeted with mixed emotion by one producer. Although glad to see this slow product show some life, the mill is concerned about getting all the orders filled by the end of June. Also there's speculation about what will happen to the buttweld market in July and August.

Steel producers selling the automotive market, however, have a little more long-range optimism to draw upon. While still waiting for heavy automotive steel ordering to begin, they're hopeful the upturn will start in August.

Sheet and Strip—Market remains in the doldrums with July expected to be the worst month of the year.

Appliance firms in the **Cleveland** area are rescheduling third quarter sheet tonnages. In that market hot and cold-rolled sheet is still available for July delivery.

Pittsburgh mills are looking ahead to late August and September for a sheet pickup. No improvement is expected in July, although today's short lead times don't give the mills too much of a far-range look at customer intentions.

"Thin" is the word a **Philadelphia** producer uses in describing July ordering. Another indicates third quarter ordering by regular customers is at a steady, but reduced level.

Sheet and strip customers at **Chicago** are still crowding for June delivery, but holding off on July bookings. Appliance makers there are cutting down hard on cold-rolled sheet ordering for July and August, as they work off tonnages ordered in June.

Plates and Shapes—Mills continue to feel heavy pressure for large plates and structurals. Strip mill plate, with some exceptions, is losing its market interest.

Pittsburgh warehouses report tight mill allotment systems for heavy plate and shapes aren't easing and no extra tonnages are coming through. However, premium steel is backing up on the brokers. One user got large tonnage of 1¼ in. broker plate at prices more than $7 under those of a few months ago.

Substantial tonnages of light plate are being used to make welded pipe in the **Cleveland** market. Some mills are turning it out in up to 1 in. thickness, although others are holding it to sizes which can be coiled on mill equipment.

There are mill carryovers on orders of as much as 60 days for both standard structurals and wide flange beams at **Chicago.** One producer has even cut structural quotas for the area. And foreign steel brokers are having little trouble getting structural and plate business for August and September.

Bar—With customer inventories apparently still high, ordering for July will probably hit a low for the year.

Some last minute bookings helped June order books at **Pittsburgh,** but not much. Exports of semi-finished product are helping that market to a degree.

Bar buyers in **Chicago** can sometimes get hot rolled sooner than they can cold finished. There's talk of a hot-rolled pickup in September, but meanwhile some of the mills are rolling structurals to keep going.

Only activity in the **Detroit** market is reported by a few mills getting auto company orders apparently for tryout 1958 car models.

A large **Philadelphia** area producer is operating bar facilities at below capacity levels. Customers are showing some concern about coming price increases, but apparently inventory worries are preventing them from buying.

Pipe and Tubing—Hedge buying against coming advances in price is helping the weak buttweld market to some extent. However, a **Philadelphia** area producer feels it's just tonnage moved up from July, August or later. Same mill reports its backlogs on oil country goods are being reduced.

PURCHASING AGENT'S CHECKLIST

Make or buy it? Here's a look at factors involved. **P. 86**

Will lower prices offset titanium cutbacks? **P. 88**

Steel container sales continue at high levels. **P. 92**

Major Buys Force Market Up

Price increase this week is most significant of the year.

When major mills came into the market for significant tonnage, they had to pay higher prices to bring in the needed tonnages.

■ Prices continued to soar as major mills came into the market for needed tonnage and were forced to pay higher prices to bring it out.

Virtually all markets are up significantly, although in varying degrees. The Pittsburgh area jumped a full $6 for No. 1 heavy melting, while Philadelphia held its rise to $1.

In addition, variation among grades was wider than normal, with some relationships jumping out of line in the need to bring in material.

The market has now regained much of the loss sustained in a three months drop from the record high of last winter. The IRON AGE Composite Price hit $65.17 in early December, then declined to $42.17 April 16. It stands this week at $54.83, up $4.

Most of the trade had not anticipated a major rise in early summer. General feeling is that the present peak may be near, that dealers will sell at present prices. However, strength of the market has been consistently underestimated in the current price climb.

Pittsburgh—The market exploded upward with a leading mill buying openhearth grades at $57 for No. 1 heavy melting, $51 for No. 2 heavy melting, and $48 for No. 2 bundles. This was equivalent to a $6 jump for primary grades, $3 for No. 2. The price of No. 1 heavy melting is now $14 over the low point less than two months ago. Although there is some talk of manipulation, general opinion is that prices were necessary to bring out the scrap.

Chicago—Stocks are building up at the dealer level. Nevertheless, the price scored another breakthrough of $3 to $5 along the entire list. Speculative buying of the past three weeks paid off, as broker buying prices continue upward. A sale of turnings at midweek failed to hold the market and prices immediately advanced. Railroad grades are also on the march.

Philadelphia—Prices here appeared to be leveling off. Steelmaking grades moved up $1, with one exception. A large mill was paying $50 for No. 2 bundles, an increase of $4. Other mills were in the market for bundles at lower figures and buying. Export outlook for the remainder of June is quiet.

New York—Continuing exports and accelerated domestic buying boosted No. 1 heavy melting price $3. Increases of $1 were reported for No. 2 heavy melting, No. 2 bundles, and blast furnace grades.

Detroit—A highly competitive and volatile situation exists here this week. Out-of-district buyers and local mills are bidding strongly for top grade industrial and dealer bundles. This is reflected in an increase of $3 for No. 1 bundles. Some grades have not yet showed the same strength. Lower automotive production and lower scrap generation are a factor.

Cleveland—Much of the broker panic passed, but prices nudged up $2 on primary grades and belatedly $5 on secondary grades. Price improvement has perked up collections. Many dealers are unloading, expecting to buy in July and August for sale in the fall.

St. Louis—Prices have increased all along the list from $1 to $8 a ton, largely because of higher prices in adjacent markets. Increases were necessary to protect the market here.

Birmingham—The market continues in a confused condition. This is due to the need for more scrap by mills and scarcity of material. No. 1 heavy melting jumped $7 when the largest consumer came into the market for considerable tonnage. No. 2 bundles jumped the same amount, although No. 2 heavy melting did not follow.

Cincinnati—Prices went up $1 in addition to the $4 jump last week. Prices of some grades were incorrectly quoted. Correct prices should have been: No. 1 heavy melting $45 to $46; No. 1 dealer bundles, $45 to $46; No. 2 heavy melting, $40 to $41; No. 2 bundles, $38 to $39; machine shop turnings, $30 to $31; mixed borings and turnings, $28 to $29; cast iron borings, $28 to $29; shoveling turnings, $33 to $34; low phos 18 in. and under, $54 to $55; random rails, $59 to $60; 18 in. railes, $67 to $68.

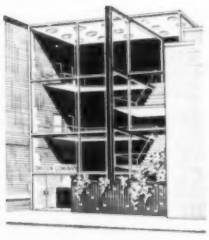
Buffalo—All primary grades are up $2 on the basis of outside strength. Dealer inventories are far below normal, strengthening the market in spite of lack of local activity.

Boston—The market is up $2 for steelmaking grades, continuing the strengthening that has prevailed here for about six weeks.

West Coast—Flow of scrap continues tight with some dealer yards almost bare. Mills attribute the bare trickle to heavy exporting, which is taking large quantities. Mills aren't too sure they will be able to take in enough to meet the melt, but have healthy inventories.

Thirst

The successful man has an unquenchable thirst for new ideas, for up-to-date methods, for every product or development that can help him in his work. No wonder, then, he turns instinctively to leading business publications in his field, for there, on both the editorial and advertising pages, he finds the news reported with skill and authority. No wonder, then, he is so receptive to both editorial and advertising copy.



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SCRAP PRICES *(Effective June 11, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 dealer bundles	56.00 to 57.00
No. 1 factory bundles	61.00 to 62.00
No. 2 bundles	47.00 to 48.00
No. 1 busheling	56.00 to 57.00
Machine shop turn.	35.00 to 36.00
Mixed bor. and trns. turn.	35.00 to 36.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	39.00 to 40.00
Low phos. punch'gs plate	61.00 to 62.00
Heavy turnings	51.00 to 52.00
No. 1 RR. hvy. melting	61.00 to 62.00
Scrap rails, random lgth.	69.00 to 70.00
Rails 2 ft and under	70.00 to 71.00
RR. steel wheels	69.00 to 70.00
RR. springs steel	69.00 to 70.00
RR. couplers and knuckles	69.00 to 70.00
No. 1 machinery cast	56.00 to 57.00
Cupola cast	47.00 to 48.00
Heavy breakable cast	45.00 to 46.00

Chicago

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	52.00 to 53.00
No. 1 factory bundles	58.00 to 60.00
No. 2 bundles	42.00 to 43.00
No. 1 busheling	51.00 to 52.00
Machine shop turn.	34.00 to 36.00
Mixed bor. and turn.	36.00 to 37.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. forge crops	63.00 to 64.00
Low phos. punch'gs plate	58.00 to 60.00
Low phos. 3 ft and under	57.00 to 58.00
No. 1 RR. hvy. melting	60.00 to 61.00
Scrap rails, random lgth.	70.00 to 71.00
Rerolling rails	77.00 to 78.00
Rails 2 ft and under	76.00 to 77.00
Locomotive tires cut	65.00 to 66.00
Cut bolsters & side frames	66.00 to 67.00
Angles and splice bars	69.00 to 70.00
RR. steel car axles	83.00 to 84.00
RR. couplers and knuckles	63.00 to 64.00
No. 1 machinery cast	54.00 to 55.00
Cupola cast	50.00 to 51.00
Heavy breakable cast	48.00 to 49.00
Cast iron brake shoe	50.00 to 51.00
Cast iron wheels	57.00 to 58.00
Malleable	63.00 to 64.00
Stove plate	50.00 to 51.00
Steel car wheels	65.00 to 66.00

Philadelphia Area

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	56.00 to 57.00
No. 2 bundles	48.00 to 50.00
No. 1 busheling	56.00 to 57.00
Machine shop turn.	38.00 to 39.00
Mixed bor. short turn.	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Shoveling turnings	41.00 to 42.00
Clean cast chem. borings	42.00 to 43.00
Low phos. 5 ft and und'r	58.00 to 59.00
Low phos. 2 ft and under	59.00 to 60.00
Low phos. punch'gs	59.00 to 60.00
Elec. furnace bundles	57.00 to 58.00
Heavy turnings	51.00 to 52.00
RR. steel wheels	62.00 to 63.00
RR. spring steel	62.00 to 63.00
Rails 18 in. and under	71.00 to 72.00
Cupola cast	45.00 to 46.00
Heavy breakable cast	54.00 to 55.00
Cast iron car wheels	59.00 to 60.00
Malleable	61.00 to 62.00
Unstripped motor blocks	39.00 to 40.00
No. 1 machinery cast	56.00 to 57.00

Cleveland

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 dealer bundles	51.00 to 52.00
No. 1 factory bundles	56.00 to 57.00
No. 2 bundles	41.00 to 42.00
No. 1 busheling	51.00 to 52.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Cut struct'r'l & plates, 2 ft & under	48.00 to 49.00
Drop forge flashings	51.00 to 52.00
Low phos. punch'gs, plate	53.00 to 54.00
Foundry steel, 2 ft & under	48.00 to 49.00
No. 1 RR. heavy melting	57.00 to 58.00
Rails 2 ft and under	72.00 to 73.00
Rails 18 in. and under	73.00 to 74.00
Railroad grate bars	35.00 to 36.00
Steel axle turnings	33.00 to 34.00
Railroad cast	56.00 to 57.00
No. 1 machinery cast	55.00 to 56.00
Stove plate	49.00 to 50.00
Malleable	62.00 to 63.00

Youngstown

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 dealer bundles	54.00 to 55.00
No. 2 bundles	46.00 to 47.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. plate	56.00 to 57.00

Buffalo

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 busheling	45.00 to 46.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	31.00 to 32.00
Low phos. plate	49.00 to 50.00
Scrap rails, random lgth.	56.00 to 57.00
Rails 2 ft and under	66.00 to 67.00
RR. steel wheels	53.00 to 54.00
RR. spring steel	49.00 to 50.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast	47.00 to 48.00
No. 1 cupola cast	41.00 to 42.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	46.00 to 47.00
Drop forge flashings	46.00 to 47.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. punch'gs plate	43.00 to 44.00
No. 1 cupola cast	47.00 to 48.00
Heavy breakable cast	43.00 to 44.00
Stove plate	44.00 to 45.00
Automotive cast	53.00 to 54.00

St. Louis

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	29.00 to 30.00
Cast iron borings	31.00 to 32.00
Shoveling turnings	31.00 to 32.00
No. 1 RR. hvy. melting	55.00 to 56.00
Rails, random lengths	63.00 to 64.00
Rails 18 in. and under	70.00 to 71.00
Locomotive tires uncut	57.00 to 58.00
Angles and splice bars	58.00 to 59.00
Std. steel car axles	73.00 to 74.00
RR. specialties	59.00 to 60.00
Cupola cast	45.00 to 46.00
Heavy breakable cast	41.00 to 42.00
Cast iron brake shoes	43.00 to 44.00
Stove plate	43.00 to 44.00
Cast iron car wheels	45.00 to 46.00
Rerolling rails	67.00 to 68.00
Unstripped motor blocks	39.00 to 40.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	44.00 to 45.00
Elec. furnace, 3 ft & under	46.00 to 47.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and short turn.	27.00 to 28.00
Shoveling turnings	28.00 to 29.00
Clean cast. chem. borings	30.00 to 31.00
No. 1 machinery cast	42.00 to 43.00
Mixed cupola cast	34.00 to 35.00
Heavy breakable cast	42.00 to 43.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$52.00 to $53.00
No. 2 hvy. melting	42.00 to 43.00
No. 2 dealer bundles	40.00 to 42.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	32.00 to 33.00
Clean cast. chem. borings	30.00 to 31.00
No. 1 machinery cast	46.00 to 47.00
Mixed yard cast	41.00 to 42.00
Charging box cast	46.00 to 47.00
Heavy breakable cast	46.00 to 47.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	48.00 to 49.00
Machine shop turn.	33.00 to 34.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	31.00 to 32.00
Electric furnace bundles	49.00 to 50.00
Elec. furnace, 3 ft & under	47.00 to 48.00
Bar crops and plate	53.00 to 54.00
Structural and plate, 2 ft	52.00 to 53.00
No. 1 RR. hvy. melting	53.00 to 54.00
Scrap rails, random lgth.	57.00 to 58.00
Rails, 18 in. and under	62.00 to 63.00
Angles & splice bars	57.00 to 58.00
Rerolling rails	62.00 to 63.00
No. 1 cupola cast	49.00 to 50.00
Stove plate	49.00 to 50.00
Charging box cast	34.00 to 35.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	41.00 to 42.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	28.00 to 29.00
Low phos. 18 in. & under	54.00 to 55.00
Rails, random lengths	62.00 to 63.00
Rails, 18 in. and under	70.00 to 71.00
No. 1 cupola cast	45.00 to 46.00
Hvy. breakable cast	42.00 to 43.00
Drop broken cast	55.00 to 56.00

San Francisco

No. 1 hvy. melting	$48.00
No. 2 hvy. melting	43.00
No. 1 dealer bundles	47.00
No. 2 bundles	35.00
Machine shop turn.	32.00
Cast iron borings	32.00
No. 1 RR. hvy. melting	48.00
No. 1 cupola cast	53.00

Los Angeles

No. 1 hvy. melting	$46.00
No. 2 hvy. melting	43.00
No. 1 dealer bundles	45.00
No. 2 bundles	33.00
Machine shop turn.	32.00
Shoveling turnings	34.00
Cast iron borings	31.00
Elec. furn. 1 ft and under (foundry)	57.00
No. 1 RR. hvy. melting	46.00
No. 1 cupola cast	$52.00 to 53.00

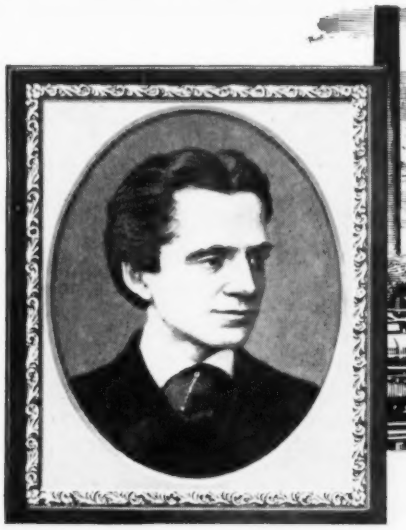
Seattle

No. 1 hvy. melting	$46.00
No. 2 hvy. melting	42.00
No. 2 bundles	$28.00 to 30.00
No. 1 cupola cast	47.00
Mixed yard cast	47.00

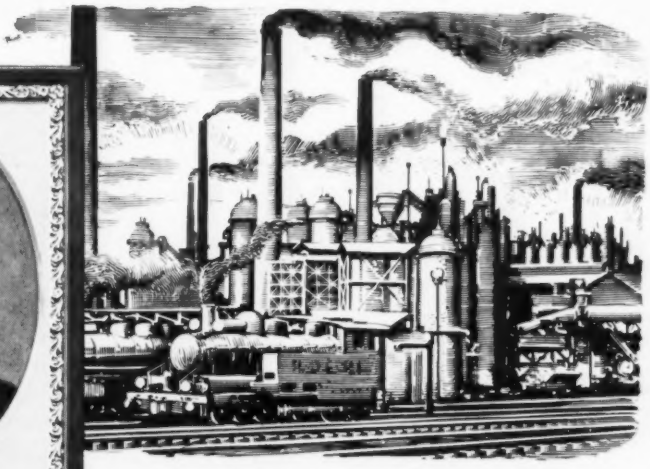
Hamilton, Ont.

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	40.00
No. 1 dealer bundles	45.00
No. 2 bundles	34.00
Mixed steel scrap	42.00
Busheling	36.00
Bush., new fact., prep'd	45.00
Bush., new fact., unprep'd	39.00
Machine shop turn.	22.00
Short steel turn.	30.00
Mixed bor. and turn.	24.00
Rails, rerolling	56.00
Cast scrap	52.00

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING



Sidney Gilchrist Thomas



Iron works in the Saar, Germany, still dependent upon the ore deposits of Lorraine . . . . .
This is the nineteenth in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

1878 — Steel from the Mines of Lorraine

They lighted the skies over the "Pittsburgh" of Europe when they charged the bessemers with the abundant high phosphorus ores of Lorraine. While the Bessemer converter heralded the "Age of Steel," it was ushered in by the process developed by Sidney Gilchrist Thomas and his cousin, Percy Gilchrist.

Lined with acid refractories, the original converters could not eliminate phosphorus and unless iron of low phosphorus content was used in the charge, the resultant steel was brittle and hard to work.

By lining the converter with basic material — magnesian limestone, and adding burned lime to the metal during the blow, the Thomas-Gilchrist process effectively removed objectionable phosphorus from the steel. This development permitted the use of high phosphorus iron and scrap and opened the vast Lorraine deposits of France, Germany, Luxembourg and Belgium to the steelmakers of Europe.

Today's manufacturers and fabricators of special steel products require scrap of known analysis. Our experience, personnel, equipment and strategic location of our offices are specifically geared to meet these requirements. It will serve you well to look into our facilities with regard to solving your particular problem in iron or steel scrap.

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BUFFALO, N. Y.	LEBANON, PENNA.	PUEBLO, COLORADO
CHICAGO, ILLINOIS	LOS ANGELES, CAL.	READING, PENNA.
CINCINNATI, OHIO	MEMPHIS, TENN.	ST. LOUIS, MISSOURI
CLEVELAND, OHIO	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
DETROIT, MICH.		SEATTLE, WASH.

In Canada MONTREAL, QUEBEC — HAMILTON, ONTARIO

EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Zinc Drops ½c, But Market Stays Weak

Prime Western now costs 11c per lb., E. St. Louis.

Lead holds for a week, then follows zinc down. Drop is 1c per lb. Price is now 13.80c at St. Louis.

■ The price of zinc dropped another ½c per lb. on June 5. Price of prime western is now 11c per lb. at E. St. Louis.

Normally this dip would have made little more than a ripple of attention for the trade. The reason: The former prices of 11½c per lb for prime western had attracted very few buyers. However, there are other factors which makes the latest price drop significant.

Government Support—Only two weeks before, the Office of Defense Mobilization had announced it would attempt to support the zinc market by increasing tonnages of zinc purchased for the stockpile.

But the American Zinc Institute report on smelter activity indicated increased government buying might not do the job as in the past. Total slab zinc shipments from domestic smelters in May easily topped the previous month. In fact, it was second highest month for the year. Deliveries to the government's account were high for the year. But despite this, stocks at smelters June 1 were up 7000 tons over a month ago, the highest point of the year.

No Sliding Tariff—The market started to weaken instead of strengthen. The Interior Dept. announced that it was asking Congress to approve a sliding tariff to protect the domestic industry, and there were some signs of possible strength. But it was discovered that this was impossible in 1957. The price then dropped.

Why no chance for sliding tariff in 1957? It is illegal under terms of the General Agreement of Tariffs and Trade, better known as GATT. This is an international conference, of which the U. S. is a member, aimed at promoting world trade through tariff and quota agreement.

Violation of GATT—The Tariff Commission of the Treasury Dept. has already informed the Senate Committee studying the proposals that they are a "clear violation" of agreements made through GATT.

Both the State and Interior Depts. admit that such legislation in 1957 would violate GATT agreements. But both contend that a sliding tariff would be legal provided it wasn't enforced before Jan. 1, 1958.

Without formidable government support, the market is in a sad state. Many consumers acknowledge that their inventories are low. But they point out that summer, their traditionally slow season, is fast approaching.

Future Bright—The only bright spot comes from diecasters. For the most part, they agree on the current state of inventories and business. But diecasters use the activity in their tool and die departments as a barometer of future activity. From this standpoint many say the future looks bright, but not, they concede, until probably late August.

Lead, enjoying a somewhat stronger market, held its price level for a week. Then its resistance faded and it dropped 1¢ a pound, with all producers going along.

Price of lead is now 13.80¢ at St. Louis, 14¢ at New York. Because lead is affected by the same factors as zinc, the market is still soft. Few consumers are expected to boost buying.

Copper

Domestic producers say they are approaching the critical price period. They have held at 32¢ per lb since February despite the pressure of lower prices in just about all world markets. They say if they can continue to do so through July the pressure will ease.

The reason: Domestic sales in May and June are about the same as March and April. Consumers reduced inventories as far as possible by buying hand-to-mouth and waiting for lower price before rebuilding stocks.

In August, business starts to pick up, especially in automotive fields where buying for new models should be in full swing. And foreign sales, now gathering strength, will firm up more.

Tin prices for the week: June 5—98.50; June 6—98.375; June 7—98.50; June 10—98.375; June 11—98.375.*

* Estimate.

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	32.00	34.00	2/18/57
Copper (CS)	30.00	30.50	5/9/57
Copper (L)	32.00	34.00	2/19/57
Lead, St. L.	13.80	14.80	6/11/57
Lead, N. Y.	14.00	15.50	6/11/57
Magnesium ingot	36.00	34.09	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	200-250	250-275	6/6/57
Zinc, E. St. L.	11.00	11.50	6/4/57
Zinc, N. Y.	11.50	12.00	6/4/57

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 179.

NONFERROUS MARKETS *(Effective June 11, 1957)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

(F temper except 6061-0)

Alloy	.032	.081	.136 - .249	.250 - 3
1100, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061-0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
0-8	42.7-44.4	57.6-61.1
12-14	43.4-44.8	58.4-62.7
24-26	46.4-46.9	68.7-78.1
36-38	54.8-55.4	91.5-94.9

Screw Machine Stock—2011-T-3

Size*	1/4	3/8-7/8	1 - 1 1/4	1 1/4-1 1/2
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length*	72	96	120	144
.010 gage	$1 352	$1 803	$2 254	$2 704
.024 gage	1 686	2 252	2 815	3 378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type	Gage	.250 - 3.00	.250 - 2.00	.188	.081	.032
AZ31B Stand. Grade			67.9	69.0	77.9	108.1
AZ31B Spec.			93.3	95.7	108.7	171.3
Tread Plate			70.6	71.7		
Tooling Plate		73.0				

Extruded Shapes

Factor	0-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered) ¶¶

AZ63A, AZ92A, AZ91C (Sand Casting) 46.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks		87	

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13		51.36	54.32
Brass, 70/30	46.85	47.20	46.75	49.76
Brass, Low	49.80	50.34	49.74	52.61
Brass, R.L.	50.84	51.38	50.78	53.65
Brass, Naval	50.91		45.22	54.32
Muntz Metal	48.99		44.80	
Comm. Bz.	52.43	52.97	52.37	54.99
Manf. Bz.	54.65		48.75	
Phos. Bz. 5%	73.17		73.67	

Free Cutting Brass Rod 34.97

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $9.50-$10.60; alloy, $14.75; Plate, HR, commercially pure, $8.00-$8.75; alloy, $10.75. Wire, rolled and or drawn, commercially pure, $7.50-$8.00; alloy, $10.00; Bar, HR or forged, commercially pure, $6.15-6.40; alloy, $6.15-$6.35; billets, HR, commercially pure, $6.00-$6.25; alloy, $6.00-$6.20.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb cont'd Be $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis ... $ 1.31
Cobalt, 97-99% (per lb) ... $2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $39.50-$53.50
Gold, U. S. Treas., per troy oz. ... $35.00
Indium, 99.9% dollars per troy oz... $ 2.25
Iridium, dollars per troy oz.... $80 to $100
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz... $22 to $24
Platinum, dollars per troy oz.... $92 to $95
Rhodium ..... $120.00 to $125.00
Silver ingots (c per troy oz.) 90.875
Thorium, per kg. $43.00
Uranium, normal per kg. $40.00
Vanadium ..... $ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.50
- No. 120 ..... 29.25
- No. 123 ..... 27.50

80-10-10 ingot
- No. 305 ..... 34.50
- No. 315 ..... 32.50

88-10-2 ingot
- No. 210 ..... 42.25
- No. 215 ..... 38.50
- No. 245 ..... 34.50

Yellow ingot
- No. 405 ..... 25.00

Manganese bronze
- No. 421 ..... 28.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.00-24.75
- 0.60 copper max. 23.75-24.50

Piston alloys (No. 122 type) ... 22.50-24.50
No. 12 alum. (No. 2 grade) ... 20.50-22.00
108 alloy 21.00-22.00
195 alloy 23.50-25.00
13 alloy (0.60 copper max.) ... 23.75-24.50
AXS-679 ..... 21.00-22.00

Steel deoxidizing aluminum, notch bar granulated or shot
- Grade 1—95-97½% 22.00-22.75
- Grade 2—92-95% 20.50-21.50
- Grade 3—90-92% 19.50-20.50
- Grade 4—85-90% 18.75-19.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1c per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	28	27¼
Yellow brass	21¾	19⅜
Red brass	24¾	24
Comm. bronze	25¾	25
Mang. bronze	19¾	19
Yellow brass rod ends	21	....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26
No. 2 copper wire	24½
Light copper	22
*Refinery brass	23¾
Copper bearing material	23¾

*Dry copper content

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26
No. 2 copper wire	24½
Light copper	22
No. 1 composition	23
No. 1 comp. turnings	22½
Hvy. yellow brass solids	17
Brass pipe	19
Radiators	18

Aluminum

Mixed old cast	13½—14½
Mixed new clips	15 —16
Mixed turnings, dry	14 —15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	23 —23½
No. 2 copper wire	21½—22
Light copper	19¾—20¼
Auto radiators (unsweated)	15¼—15½
No. 1 composition	20½—21
No. 1 composition turnings	19½—20
Cocks and faucets	16½—17
Clean heavy yellow brass	14 —14½
Brass pipe	17 —17½
New soft brass clippings	18 —18½
No. 1 brass rod turnings	15½—15¾

Aluminum

Alum. pistons and struts	5½— 6
Aluminum crankcases	10½—11
1100 (28) aluminum clippings	13½—14
Old sheet and utensils	10½—11
Borings and turnings	6½— 7
Industrial castings	10½—11
2024 (24S) Clippings	12 —12½

Zinc

New zinc clippings	4 — 4½
Old zinc	3 — 3¼
Zinc routings	1¾— 2
Old die cast scrap	1¾— 2

Nickel and Monel

Pure nickel clippings	85-90
Clean nickel turnings	70-75
Nickel anodes	85-90
Nickel rod ends	85-90
New Monel clippings	45-48
Clean Monel turnings	35-40
Old sheet Monel	44-45
Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	18

Lead

Soft scrap lead	10½—11
Battery plates (dry)	5¾— 6
Batteries, acid free	2¾— 3¼

Miscellaneous

Block tin	75 —76
No. 1 pewter	59 —60
Auto babbitt	39 —40
Mixed common babbitt	11½—12
Solder joints	17 —17½
Siphon tops	42
Small foundry type	13¼—13½
Monotype	13¼—13½
Lino. and stereotype	12¼—12½
Electrotype	11¼—11½
Hand picked type shells	8¼— 8¾
Lino. and stereo. dross	4 — 4¼
Electro. dross	3¼— 3½

COMPARISON OF PRICES

(Effective June 11, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**: declines appear in *Italics*.

	June 11 1957	June 4 1957	May 14 1957	June 12 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.28
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	50.00	50.00	50.00	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$10.30	$10.30	$10.30	$9.85
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.55
Special coated mfg. ternes	9.55	9.55	9.55	9.10
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	43.25	43.25	38.25
Wrought iron bars	11.50	11.50	11.50	11.50
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.60¢
Rails: (per 100 lb.)				
Heavy rails	$5.275	$5.275	$5.275	$4.725
Light rails	6.25	6.25	6.25	5.65
Semifinished Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.625	4.625	4.625	4.225
Finished Steel Composite: (per pound)				
Base price	5.670¢	5.670¢	5.670¢	5.179¢

	June 11 1957	June 4 1957	May 14 1957	June 12 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$68.88	$68.88	$68.88	$65.26
Foundry, Valley	65.00	65.00	65.00	60.50
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	65.00	65.00	65.00	60.50
Basic, del'd Philadelphia	68.38	68.38	68.38	64.48
Basic, Valley furnace	64.50	64.50	64.50	60.00
Malleable, Chicago	65.00	65.00	65.00	60.50
Malleable, Valley	65.00	65.00	65.00	60.50
Ferromanganese, cents per lb‡ 74 to 76 pct Mn base.	12.75¢	12.75¢	12.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$64.56	$64.56	$64.56	$60.29
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	**$56.50**	$50.50	$46.50	$44.50
No. 1 steel, Phila. area	**56.50**	55.50	49.50	46.50
No. 1 steel, Chicago	**51.50**	46.50	41.50	43.50
No. 1 bundles, Detroit	**46.50**	43.50	39.00	37.50
Low phos., Youngstown	**56.50**	54.50	45.50	50.50
No. 1 mach'y cast, Pittsburgh	56.50	56.50	53.50	55.50
No. 1 mach'y cast, Philadel'a.	56.50	56.50	55.50	54.50
No. 1 mach'y cast, Chicago	**54.50**	49.50	45.50	48.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	**$54.83**	$50.83	$45.83	$44.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	32.00	32.00	32.00	46.00
Copper, Lake, Conn.	32.00	32.00	32.00	46.00
Tin, Straits, New York	98.375†	98.375	97.625	94.00
Zinc, East St. Louis	*11.00*	11.50	11.50	13.50
Lead, St. Louis	*13.80*	14.80	15.30	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	25.90
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	34.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 184→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	66.50	67.00	67.50	68.00	
Birmingham *R3*	58.50	59.00*			
Birmingham *W9*	58.50	59.00*	63.00		
Birmingham *U4*	58.50	59.00*	63.00		
Buffalo *R3*	64.50	65.00	65.50	66.00	
Buffalo *H1*	64.50	65.00	65.50	66.00	
Buffalo *W6*	64.50	65.00	65.50	66.00	
Chester *P2*	66.50	67.00	67.50		
Chicago *I4*	64.50	65.00	65.00	65.50	
Cleveland *A5*	64.50	65.00	65.00	65.50	69.50†
Cleveland *R3*	64.50	65.00	65.00	65.50	
Duluth *I6*	64.50	65.00	65.00	65.50	69.50†
Erie *I4*	64.50	65.00	65.00	65.50	69.50†
Everett *M6*	66.00	66.50	67.00		
Fontana *K1*	72.50	73.00			
Geneva, Utah *C7*	64.50	65.00			
Granite City *G2*	66.40	66.90	67.40		
Hubbard *Y1*			65.00		
Ironton, Utah *C7*	64.50	65.90			
Midland *C11*	64.50				
Minnequa *C6*	66.50	67.00	67.50	68.00	
Monessen *P6*	64.50				
Neville Is. *P4*	64.50	65.00	65.00	65.50	69.50†
N. Tonawanda *T1*		65.00	65.50	66.00	
Sharpsville *S3*	64.50	65.00	65.00	65.50	
So. Chicago *R3*	64.50	65.00	65.00		
Swedeland *A2*	66.50	67.00	67.50	68.00	
Toledo *I4*	64.50	65.00	65.00	65.50	
Troy, N. Y. *R3*	66.50	67.00	67.50	68.00	72.50
Youngstown *Y1*			65.00	65.50	

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct); 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31 to 0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $78.50; Jackson, *J1*, *I4* (Globe Div.), $77.25; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 'premium' for all grades silvery 6 pct to 14 pct.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	21.25	22.75	22.25	24.25	—	26.00	38.25	31.00	35.50	—	16.00	27.75	16.25
Slabs, billets	26.00	29.00	27.00	30.25	30.75	32.00	47.50	38.50	44.75	—	20.75	—	21.00
Billets, forging	—	35.00	35.75	36.50	39.50	39.00	59.75	45.25	53.50	30.75	27.25	27.75	27.75
Bars, struct.	40.50	41.25	42.50	43.25	46.25	46.00	70.25	53.25	62.25	36.25	32.50	33.00	33.00
Plates	42.50	43.25	44.50	45.50	48.00	48.75	73.75	57.50	67.00	38.75	33.75	35.50	34.50
Sheets	46.75	47.25	49.25	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Strip, hot-rolled	34.50	37.50	35.75	39.00	—	42.50	66.50	51.50	61.00	—	29.75	—	30.75
Strip, cold-rolled	43.25	47.25	45.75	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	39.25	40.25 40.50	41.00 41.25	44.00	43.75	66.75 67.00	50.50 51.00	59.25 59.50	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A5*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A5*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton Massillon, O., *R3*; Harrison, N. J., *D5*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1*; New Bedford, Mass. (.25¢ per lb higher), *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A5*; Massillon, O., *R3*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*; Gary, *U1*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*.

IRON AGE

STEEL PRICES

(Effective June 11, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													14.55 *C11*
	Harrison, N. J.													
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *N8*				
	Pawtucket, R. I. Worcester, Mass.									7.48 *A5, N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3, T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3, W8*	$107.00 *U1, R3, W8*	5.90 *U1*	5.00 *U1, W8* 5.00 *P13*	7.35 *U1, Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1, T8* 6.95 *M8*			7.75 *W8, S9*	14.55 *A1, S9, T8*
	Cleveland, Ohio									6.85 *A5, J3*			7.75 *J3*	
	Detroit, Mich.			$107.00 *R3*					4.775 *G3, M2*	6.95 *M2, G3, D2, P11*	7.05 *G3*	10.10 *G3, D2*	7.75 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1, I3*	5.25 *I3*	4.675 *U1, I3, Y1*	6.85 *Y1*	6.95 *U1, I3, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*				5.00 *N4*			4.775 *N4*					
	Indianapolis, Ind.									7.00 *C5*				
	Newport, Ky.												7.75 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1, C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1*	$91.50 *U1, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P6*	5.750 *P6* 6.85 *J3, B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3, F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*			7.35 *Y1*			6.85 *Y1, C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.75 *K1*	8.10 *K1*	5.90 *K1*	5.525 *K1*	8.70 *K1*				
	Geneva, Utah		$91.50 *C7*			5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B3*		5.425 *B2, C7*	8.90 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C6*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7, B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.					5.20 *A8*			4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2, R3* 5.00 *C16*	7.35 *T2*		4.675 *T2, R3* 4.975 *C10* 4.675 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas	$80.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

STEEL PRICES

(Effective June 11, 1957)

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$10.15 *B3*	$5.85 *B3*	
	Worcester, Mass.										6.10 *A3*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A3,R3, N4,W8,K2*			
	Sterling, Ill.										5.90 *N4,K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A3*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *A9*	5.75 *A9*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1,Y1*	7.50 *U1, Y1*
	Granite Cty., Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A3, P6,J3*	$10.05 *J3, U1*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.30 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$10.05 *W3, W5*	$8.75 *W3, W5*	7.50 *W5*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.30 *Y1*			
WEST	Fontana, Cal.	5.525 *K1*	7.00 *K1*				7.75 *K1*	9.775 *K1*				$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.60 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	.575 *T2*	6.30 *T2, R3*							5.80 *T2,R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.										6.05 *S2*			

STEEL PRICES

(Effective June 11, 1957)

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B3*	6.125 *B3,R3*	8.325 *B3,B5*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.70 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.95 *A2*	5.925 *A2*	6.85 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	* 6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass.	5.225 *M7*	5.225 *M7*	7.10 *B5,C14*		8.625 *A5*						7.50 *A5,W6*
	Milton, Mass.					8.625 *B5*						9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,A9*		6.85 *A9*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T3*	8.325 *R3,R2, T3*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.075 *P13*	5.075 *U1,R3, N4* 5.075 *P13*	6.85 *A5,B5, W10,L2 W8,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9 W10*	5.875 *W8* 7.425 *U1*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2 R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R3*	6.225 *G3* 6.125 *R3*	8.525 *B5,P3, P8* 8.325 *R3*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth, Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M3*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.175 *N4*	5.175 *N4*					4.85 *N4*				7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, J3,R3,S9, B4,W10,C11*	6.125 *U1, C11,J3*	8.325 *A5,R3, S9,C8,W10, C11*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W3*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1* 7.25 *U1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.60 *K1*		7.60 *K1*	8.00 *K1*	
	Geneva, Utah							4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3,P14*	7.175 *B2*	10.20 *P14*	8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7* 5.825 *B2* 6.025 *P9*	5.775 *C7* 5.825 *B2* 6.025 *P9*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2, N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.275 *A8*	5.275 *A8*									7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.075 *C16*	5.075 *T2,R3* 5.075 *C16*	7.45 *C16*			7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

†Merchant Quality—Special Quality .35¢ higher.

STEEL PRICES *(Effective June 11, 1957)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashvill
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts, pct f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¼ In.		1 In.		1¼ In.		1½ In.		2 In.		2½ 3 In.		2 In.		2½ In.		3 In.		3½ 4 In.	
STANDARD T. & C	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B5*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Youngstown *R3*	9.25	+10.00	12.25	+6.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fontana *K1*	+3.75	+19.00	+0.75	+15.00	2.75	+10.50	5.25	+9.75	5.75	+8.75	6.25	+8.25	7.75	+8.50								
Pittsburgh *J3*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50	5.25	+20.25	1.25	+15.50	3.75	+13.00	5.25	+11.50
Alton, Ill. *I1*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Sharon *M3*	9.25	+10.00	12.25	+2.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fairless *N2*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Pittsburgh *N1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50	5.25	+20.25	1.25	+15.50	3.75	+13.00	5.25	+11.50
Wheeling *W5*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50								
Wheatland *W4*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50								
Youngstown *Y1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50	5.25	+20.25	1.25	+15.50	3.75	+13.00	5.25	+11.50
Indiana Harbor *Y1*	8.25	+9.00	13.25	+2.00	14.75	1.50	17.25	2.25	17.75	3.25	18.25	3.75	19.75	4.25								
Lorain *N2*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50	5.25	+20.25	1.25	+15.50	3.75	+13.00	5.25	+11.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B5*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Youngstown *R3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Fairless *N2*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Fontana *K1*	0.75		4.75		7.75		8.25		8.75		9.25		9.75									
Pittsburgh *J3*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+9.50	11.25	+4.50
Alton, Ill. *I1*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Sharon *M3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Pittsburgh *N1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+9.50	11.25	+4.50
Wheeling *W5*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Wheatland *W4*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Youngstown *Y1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+9.50	11.25	+4.50
Indiana Harbor *Y1*	12.75	+1.00	16.75	3.00	19.75	7.50	20.25	6.25	20.75	7.25	21.25	7.75	21.75	6.50								
Lorain *N2*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+9.50	11.25	+4.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.13	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium ..... .83 D-3, D-5
Oil hardened manganese ..... .45 O-2
Special carbon ..... .41 W-1
Extra carbon ..... .345 W-1
Regular carbon ..... .29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A8, J2, L4*) 10 pct	Plate (*A8, J2, L4*) 15 pct	Plate (*A8, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				35.50
	304	36.20	40.30	44.50	37.75
	316	41.60	45.90	50.15	55.50
	321	37.95	42.10	46.40	44.75
	347	41.25	46.45	51.70	54.25
	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

CR Strip (S9) Copper, 10 pct, 2 sides, 39.85; 1 side, 33.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	9.80	9.20	
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Meter	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60		
		Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N5*); Vandergrift (*U1*); Warren, O. (*R5*) 20¢ higher, HR; Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annld ¢ lb.	Merch. Wire Galv. ¢ lb.
Alabama City *R3*	167	181	195	187		8.10	8.50
Aliquippa, Pa. *J3****	164	179		181	8.20	8.20	8.875
Atlanta *A2***	166	182	192	190	8.05	8.05	8.65
Bartonville *K2***	166	182	198	190	8.30	8.30	9.06
Buffalo *W6*						8.20	8.75
Chicago, Ill. *N4***	164	180	167	196	188	8.35	9.10
Cleveland *A6*	173					8.20	8.75
Cleveland *A5*						8.20	
Crawfordsville *M4***	166	182		198	190	8.30	9.05
Donora, Pa. *A5*	164	176		196	184	8.20	8.75
Duluth *A5*	164	176	167	196	184	8.20	8.75
Fairfield, Ala. *T2*	164	176		196	184	8.20	8.75
Galveston *D4*†	169						
Houston *S2*	169	181		195	189	8.45	9.00
Johnstown, Pa. *B3***	164	180	167		188	8.20	8.90
Joliet, Ill. *A5*	164	176		196	184	8.20	8.75
Kokomo, Ind. *C9**	166	178		198	186	8.30	8.85
Los Angeles *B2***						9.15	9.90
Kansas City *S2**	169	181		195	189	8.45	9.00
Minnequa *C6*†	169	181	172	201	189	8.45	9.00
Monessen *P6*	167	185			191	8.10	8.10
Palmer, Mass. *W6*						8.50	9.05
Pittsburg, Cal. *C7*	183	199		220	204	9.15	9.70
Rankin, Pa. *A5*	164	176			184	8.20	8.75
So. Chicago *R3*	167	181		195	187	8.10	8.50
S. San Francisco *C6*†				220		9.15	9.70
Sparrows Pt. *B3***	166			198	190	8.30	9.00
Struthers, O. *Y1**						8.20	8.85
Worcester *A5*	170					8.50	9.05
Williamsport, Pa. *S5*			175				

* Zinc less than .10¢ ‡ Plus zinc extras.
** 11-12¢ zinc. † Wholesalers only.
*** .10¢ zinc.

WAREHOUSES

Metropolitan Price, dollars per 100 lb

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled 18 ga. & hvr.	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Hot-Rolled special quality	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta	...	8.17	9.37	9.83	8.21	8.55	8.59	8.45	...	10.23	...	...	...	...
Baltimore	$.10	7.98	9.08	9.31	8.46	8.36	8.85	8.53	...	9.13	14.99	14.44	18.39	18.09
Birmingham	.15	7.80	9.00	9.52	7.82	8.16	8.20	8.07	8.44	10.04 10.12				
Boston	.10	8.94	9.98	11.06	8.99	9.28	9.20	9.17	9.57	...	15.79	14.79	19.14	18.39
Buffalo	.15	8.00	9.15	10.83	8.20	8.65	8.65	8.40	8.85	8.85	15.65	14.65	19.01	18.25
Chicago	.15	7.95	9.15	9.80	7.97	8.31	8.35	8.22	8.50	8.50	15.30	14.30	18.65	17.90
Cincinnati	.15	8.09	9.20	9.80	8.29	8.67	8.89	8.53	8.87	8.99	15.61	14.61	18.96	18.21
Cleveland	.15	7.93	9.13	9.70	8.07	8.54	8.72	8.31	8.67	8.75	15.39	14.39	18.74	17.99
Denver	...	9.70	11.30	12.49	9.80	9.70	9.80	9.95	...	10.65	...	...	...	17.60
Detroit	.15	8.18	9.40	10.15	8.32	8.66	8.89	8.52	8.86	8.85	15.46	14.56	18.81	18.16
Houston	...	8.80	9.75	...	7.75	8.80	8.00	8.05	...	10.65	15.50	...	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	8.83	8.87	8.73	...	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.20	10.90	11.35	9.25	9.75	9.25	9.10	9.30	12.20	16.45	15.60	20.30	19.70
Memphis	.15	8.02	9.22	...	8.12	8.35	8.39	8.25	...	9.85	...	...	...	...
Milwaukee	.15	8.08	9.28	9.93	8.10	8.44	8.56	8.35	8.71	8.72	15.43	14.43	18.78	18.03
New York	.10	8.55	9.76	10.31	9.00	9.11	9.01	9.11	9.48	...	15.02	14.69	18.42	18.29
Norfolk	.20	8.00	...	...	8.40	8.35	8.70	8.45	...	10.70	...	...	...	...
Philadelphia	.10	8.25	9.17	10.34	8.92	8.78	8.80	8.81	9.18	9.41	15.61	14.61	18.96	18.21
Pittsburgh	.15	7.93	9.14	10.15	8.07	8.31	8.35	8.22	8.59	8.75	15.30	14.30	18.65	17.90
Portland	...	9.20	11.20	11.55	11.05	9.00	9.35	9.35	...	13.80	16.70	16.10	20.40	20.25
San Francisco	.10	9.05	10.40	10.90	9.05	9.30	9.15	9.15	9.90	12.40	16.45	15.60	20.30	19.70
Seattle	...	9.55	10.70	11.60	9.55	9.30	9.35	9.50	9.85	13.40	16.55	15.85	19.50	19.45
Spokane	.15	9.70	10.85	11.75	9.70	9.45	9.50	9.65	10.00	13.55	...	16.75	...	20.35
St. Louis	.15	8.29	9.49	10.16	8.34	8.67	8.82	8.58	9.11	9.11	15.66	14.66	19.01	18.26
St. Paul	.15	8.39	9.59	10.26	8.43	8.90	8.94	8.53	...	9.21	...	14.62	...	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
† 16 gage. †† 13½¢ zinc. ‡ Deduct for country delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26 0.10	0.41 0.60	0.61 0.80	0.81 1.05	1.06 1.35
Baltimore, Md. *T8*	9.20	10.40	12.60	15.60	18.55
Bristol, Conn. *W12*		10.40	12.60	15.60	18.55
Boston *T8*	9.20	10.40	12.60	15.60	18.55
Buffalo, N. Y. *R7*	8.65	10.10	12.30	15.30	18.25
Carnegie, Pa. *S9*	8.65	10.10	12.30	15.30	
Cleveland *A5*	8.65	10.10	12.30	15.30	18.25
Detroit *D1*	8.75	10.20	12.40	15.40	
Detroit *D2*	8.75	10.20	12.40		
Dover, O. *G4*	8.65	10.10	12.30	15.30	18.25
Evanston, Ill. *M8*	8.65	10.10	12.30		
Franklin Park, Ill. *T8*	8.75	10.10	12.30	15.30	18.25
Harrison, N. J. *C11*			12.60	15.60	18.55
Indianapolis *C5*	8.80	10.25	12.30	15.30	18.25
Los Angeles	10.85	12.30	14.50		
New Castle, Pa. *B4*	8.65	10.10	12.30	15.30	
New Haven, Conn. *D1*	9.10	10.40	12.60	15.60	
Pawtucket, R. I. *N7*	9.20	10.40	12.60	15.60	18.55
Pittsburgh *S7*	8.65	10.10	12.30	15.30	18.25
Riverdale, Ill. *A1*	8.75	10.10	12.30	15.30	18.25
Sharon, Pa. *S1*	8.65	10.10	12.30	15.30	18.25
Trenton *R4*	11.05	10.40	12.60	15.60	18.55
Wallingford *W1*	9.10	10.40	12.60	15.60	18.15
Warren, Ohio *T4*	8.65	10.10	12.30	15.30	18.25
Worcester, Mass. *A5*	9.20	10.40	12.60	15.60	18.55
Youngstown *C5*	8.65	10.10	12.30	15.30	18.25

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	36.34	42.56	33.21	...
	2½	12	48.94	57.31	44.73	...
	3	12	56.51	66.18	51.66	...
	3½	11	65.97	77.25	60.30	...
	4	10	87.61	102.59	80.07	...
National Tube	2	13	36.34	42.56	33.21	...
	2½	12	48.94	57.31	44.73	...
	3	12	56.51	66.18	51.66	...
	3½	11	65.97	77.25	60.30	...
	4	10	87.61	102.59	80.07	...
Pittsburgh Steel	2	13	36.34	42.56	...	...
	2½	12	48.94	57.31	...	...
	3	12	56.51	66.18	...	...
	3½	11	65.97	77.25	...	...
	4	10	87.61	102.59	...	...

(Effective June 11, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.275	6.25	6.60				
Cleveland							13.85
So. Chicago *R3*				9.225			
Ensley *T2*	5.275	6.25					
Fairfield *T2*		6.25		9.225		6.275	
Gary *U1*	5.275					6.275	
Huntington *C16*		6.25					
Ind. Harbor *I3*	5.275		6.60	9.225		6.275	
Ind. Harbor *Y1*				9.225			
Johnstown *B3*		6.25					
Joliet *U1*			6.60				
Kansas City *S2*				9.225			13.85
Lackawanna *B3*	5.275	6.25	6.60			6.275	
Lebanon *B3*							13.85
Minnequa *C6*	5.275	6.75	6.60	9.225		6.275	13.85
Pittsburgh *P5*							13.85
Pittsburgh *J3*				9.225			
Seattle *B2*				9.725		6.425	13.85
Steelton *B3*	5.275		6.60			6.275	13.85
Struthers *Y1*				9.225			
Torrance *C7*						6.425	
Williamsport *S5*		6.15					
Youngstown *R3*				9.225			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $15.00 to $15.75
Foundry, beehive (f.o.b. oven)
$17.50 to $19.00

Foundry oven coke

Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	47.92
Electrodeposited	39.25
Brass, 80-20, ball anodes, 2000 lb or more	50.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 2¢ per lb)	21.25
Nickel, 99 pct plus, rolled carbon, 5000 lb (Rolled depolarized add 3¢ per lb)	1.0225
Cadmium	1.70
Tin, ball anodes and elliptical $1.07 per lb.	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	74.80
Copper sulphate, 100 lb bags, per cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums (Philadelphia price 23.30)	23.05
Zinc cyanide, 100 lb	59.00
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 100,000 lb or more	31.00

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
	Pct Discounts			
½" and smaller x 6" and shorter	52½	56½	58½	59½
⅝" thru 1" x longer than 6"	43½	47½	50	51½
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	52½	56½	58½	59½
Lag, all diam. x 6" & shorter	52½	56	58	59
Lag, all diam. longer than 6 in.	44½	48	50	51
Plow bolts, ½" and smaller x 6" and shorter	52	55½	57	58

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.

	Full Case or Keg Price
⅝ in. or smaller	61½
¾ in. to 1 in. inclusive	57½
1⅛ in. to 1½ in. inclusive	62½
1⅝ in. and larger	56

C. P. Hex reg. & hvy.

⅝ in. and smaller	61½
¾ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

Hot Galv. Nuts (All Types)

¾ in. and smaller	48

Semi-finished Hex Nuts

⅝ in. or smaller	61½
¾ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

(Add 25 pct for broken case or keg quantities)

Finished

1 in. and smaller	64

Rivets

	Base per 100 lb
½ in. and larger	$11.50
	Pct Off List
7/16 in. and smaller	23

Cap Screws

	Discount (Packages) Bright	Treated	H. C. Heat
New std. hex head, packaged			
⅝" diam. and smaller x 6" and shorter	44		31
¾", ⅞" and 1" diam. x 6" and shorter	27		9
⅝" diam. and smaller x longer than 6"	14		+ 6
¾", ⅞" and 1" diam. & longer than 6"	½		+24

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	44	61
¾" through 1" dia. x 6" and shorter	27	49

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Plain Finish Cartons	19	32
Bulk — *Quantity*		
To ¾" diam. incl. — 25,000-200,000	9	54
5/16 to ½" diam. incl. — 15,000-100,000	9	54
All diam. over 3" long — 5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
In cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller — 15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.7
Chicago	134.1
San Francisco-L. A.	141.8

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	102.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick *Per net ton*

Standard chemically bonded, Balt.	$105.00
Standards chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard, Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite *Per net ton*

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, West of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd. East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 3 to 10 micron, 98%, 99.8+% Fe	88.0¢ to $2.90
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	37.4¢ to 41.5¢
Copper, electrolytic	45.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese f.o.b. Exton, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder, 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	$1.02
Stainless steel, 316	$1.20
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh) $3.75 (nominal)	
Zinc, 10 ton lots	18.5¢ to 31.7¢

FERROALLOY PRICES

(Effective June 11, 1957)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C ...	41.50	0.20% C ...	38.50
0.03% C ...	41.00	0.50% C ...	38.25
0.06% C ...	39.50	1.00% C ...	37.50
0.10% C ...	39.00	1.50% C ...	37.35
0.15% C ...	38.75	2.00% C ...	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si... 35.50
8.50% max. C, 50-55% Cr, 3-6% Si.. 24.00
8.50% C, 50-55% Cr, 3% max. Si... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (¼" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Maganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ⅛ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
S. Duquesne	12.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 25.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80-85% Mn, 5.0-7.0% Si....	28.60	31.40	32.60

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe..	23.70	22.40
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si ...	13.00	75% Si ...	16.40
65% Si ...	15.25	85% Si ...	18.10
	90% Si ...	19.50	

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	4.90
Less ton lots	4.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth Pa., per pound contained Mo. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton..... $90.00
10 tons to less carload..... $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered..... $2.60 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa. Langeloth, Pa. $1.33

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract, basis, per pound contained V_2O_5 ..... $1.38

Zirconium contract basis per lb of alloy
35-40% f.o.b. freight allowed, carloads, packed ..... 27.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload..... $5.50

Bortam, f.o.b. Niagara Falls,
Ton lots per pound..... 45¢
Less ton lots, per pound... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... 1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B..... .85
14 to 19%..... 1.20
19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese - Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots $1.46
Less ton lots 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.15

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For All Types of Cars

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"ANYTHING containing IRON or STEEL"

Heavy Tools Moving Well in Midwest

Used machinery dealers there report millers, grinders, punches, shears, and stamping equipment in strong demand.

High prices hamper their efforts to build showroom floor inventories.

▪ Sales of heavy equipment in the Chicago market have been running above year ago levels. With demand strong, dealer inventories of these items continue low and prices are rising. It's somewhat of a contrast to the market for used toolroom equipment where sales volume has been off, while prices are holding up.

Milling machines, internal and centerless grinders have surprising strength in the Midwest market. And material for the structural fabricating market shows equal gains. Beam punches, plate and angle shears are in demand by consumers and actively sought by dealers.

Fierce Bidding—Though hampered by tight credit and slow payments from their own buyers, dealers are making strenuous efforts to build their inventories without much success. As a result there's strong competition between bidders at local auctions.

The spring push for late model screw machines hit Midwestern inventories of this type of equipment hard. The current slowdown in business for this item seems due less to lack of customer demand than to inadequate dealer stocks of late equipment.

Hotter Market Due?—Part of the reason for the spirited bidding at auctions is the belief of a growing number of dealers that the market in the second half of 1957 will be even hotter than the strength shown all through first quarter of this year. Though the second quarter has shown some decline, this has been limited mainly to light, toolroom equipment or very light stamping equipment.

Heavy equipment, and stamping equipment in the heavier categories continue at extremely high levels, with many dealers reporting they are running ahead of year-ago levels.

Bargains Scarce — One thing is certain. Any dealer who attempts to stock heavily at present price levels will find no bargains. He'll have a high-cost inventory on his shop floor and even with the price advances that have been made in recent months, his profit margin will be running below last year's. He's trading more dollars, and in some cases he's even selling a higher volume of machine tool units, but he is in a much more precarious profit situation than last year.

This applies not only to the smaller dealer with a heavy portion of his total stock in the slower moving toolroom equipment. It has also been reported in an increasing number of instances by large firms handling considerable stocks of production line equipment. Production line tool prices have advanced more rapidly, but even here, the profit is pinched.

Everybody needs inventory, but at today's prices, it isn't easy to stock the showroom floor. What's more, it seems to be getting tougher.

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSOR
450 cu. ft. Ingersoll Rand XRE, 100# Pressure
100 H.P. Westinghouse Motor 440/3/60
BENDER—PIPE
6" I. S. Pipe Bender, Titan Model
BENDING ROLLS
10' x ½" Kling Pyramid Type—LATE
10' x ⅝" Ramsome, Pyramid Type
27' x 1' Southwark, Pyramid Type
BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x ¼" Dreis & Krump
12' x ⅜" Dreis & Krump No. 256
BRAKES—PRESS TYPE
8' x ¼" Gee. A. Obi
10' x 5/16" Pacific Hydraulic
14' x ¼" Superior Hydraulic—NEW
BUILDINGS
70' x 740' x 30' Under Cord
50' x 325' x 24' Under Cord
BULLDOZERS
#7 Ajax, 22" Stroke, 12"x65" Face of Crosshead
#27 W & W, 22" Stroke, 16"x80" Face of Crosshead
CORRUGATING MACHINE
12' Stanco Corrugating Machine, Rolls 24" Dia.
CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	56' Span	220/3/60
5 ton Euclid	30' Span	220/3/60
5 ton Whiting	48' Span	230/3/60 A.C.
5 ton Case	59' Span	220/3/60
8 ton P&H	55' Span	220/3/60
10 ton Shepard Niles	27' Span	220/3/60
10 ton Shepard Niles	28' Span	440/3/60
15 ton Shepard Niles	52' Span	230 Volt D.C.
15 ton Shepard Niles	37' Span	220/440 A.C.
15 ton Shepard Niles	55' Span	220/440 A.C.
20 ton P&H	57' Span	220/440 A.C.

DIEING MACHINE
60-ton Henry & Wright, Roll Feed, Scrap Cutter
4" Stroke NEW 1950
DRAW BENCH
10,000# Aetna Standard Single Draw Tube Draw Bench, 44 Ft. Max. Length of Draw
FORGING MACHINES
1" to 5" Acme, Ajax, National
FURNACE—ANNEALING
Lithium Atmosphere Car Type Annealing Furnace
Heating Section 21' L, 14'6" W, 17' H Overall
HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—600 lb to 20,000 lb.
LEVELERS—ROLLER
37" Torrington, 19 Roll 1-31/32" Dia. Backed up
54" McKay, 17 Rolls, 3⅜" Dia.
108" American, 17 Rolls, 4½" Dia.
PLANER—PLATE EDGE
35' Southwark, 16 Pneu. Jacks, Capy. 1½"
PRESSES—HYDRAULIC
800 ton Clearing, 48" Stroke, Bed 48 x 48"
4500 Baldwin-Lima-Hamilton Hydr. Forging Press
PRESSES—TOGGLE DRAWING
#3½ Bliss 125 ton, Bolster 19" x 26"
#4 Bliss 170 ton, Bed Area 34" x 31"
#1018 Bliss 1550", Die Space 60" x 72"
PRESSES—STRAIGHT SIDE
110 ton Cleveland 55D-54, 5" Stroke
Bolster 32" x 54", Air Cushion
150 ton Cleveland 65D-60, 6" Stroke
Bolster 40" x 60", Air Cushion
PUNCH & SHEAR COMBINATIONS
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 1¼" Buffalo Universal Ironworker
ROLLING MILLS
6" x 5" Torrington Wire Flattening Mill Line
9" Bar Mill
10" x 14" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Farrel Two Stand Two High
26" x 72" Cold Rolling Mill
22" x 40" Three High Sheet Mill
ROLLS—FORMING
11 Stand Dahlstrom, Takes widths to 8"
SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"
SHEAR—BAR
48" Mesta Bar Shear, Capacity 4" x 45" Slabs Hot.
Motor Drive with 75 H.P. D.C. Motor
SHEAR—GATE
12' x ⅜" Niagara Model 1312, NEW 1951
SHEAR LINES
66" Shear Line, With Leveller & Tables
96" x 14 Ga. Cleveland, With Payoff, Leveler, Elect
SHEARS—SQUARING
6' x 10 Ga. Niagara No. 672
8' x ¼" Niagara—NEW 1953
SLITTER
36" Paxon Slitting Line
STRAIGHTENER
No. 3 Medart 3 Roll. Capacity to 4½" Tubing
SWAGING MACHINES
#4 Fenn, Capacity 2¼" Tubing, LATE
#6½-A Fenn, Capacity 2¼" Tube 3¾" Solid 10" Die Length Hydraulic Feed, LATE
TUBE MILL
Ezra 1K Welded Tube Mill, Cut-off & Transformer
Capy. ½" OD 0.28 wall to 2" OD .130 wall
WELDER—SEAM
200 KVA Progressive Universal, 220 Volt

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Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased

CHECK THIS LIST FOR HIGH GRADE TOOLS

MISCELLANEOUS
Welder, 100 KVA Taylor Winfield
Welder, 50 KW Sciaky Dynatrol automatic, press spot
Threader, Model 11B Rickert-Shafer nipple machine
Threader, 9/16" National precision thread roll
Threader, Type R Economy threader and spotter
Slotter, 36" Rockford hydraulic vertical, late, MD
Shaper, 36" Rockford openside universal shaper-planer, mechanical
Roll, No. 1L Kane & Roach vertical beading
Roll, No. 18 Kane & Roach straightening
Planer, 30" x 30" x 8' Cincinnati, two rail, one side head
Lapper, No. 2 Cincinnati centerless, MD
Hone, No. 224-B Barnes hydraulic single spindle
Engraver, Model BL 2416 Pratt & Whitney Keller, 3 spindle
Compressor, 850 CFM Sullivan Class WJ-3 angle compound
Compressor, 380 CFM Ingersoll Rand type XRE, 2 stage
Cut-off, 8" capacity Campbell "Cutamatic" abrasive
Cut-off, No. 2A Modern automatic, late
SAWS
10½" x 10½" No. 3 Motch & Merryweather cold metal
10" x 10" Racine hydraulic shear cut
8" x 6" Peerless universal
8" x 6" No. 6 Marvel high speed
PRESSES
750 ton No. 3 National Maxi-press, all steel, forging, late
106 ton No. 78 Toledo S.C., overhanging, gap (two)
60 ton Henry & Wright high speed, dieing
50 ton Henry & Wright high speed, dieing (two)
95 ton No. 8 Bliss Consolidated OBI, MD
60 ton No. 609B Perkins, OBI
800 ton Model 2E48-800 Hamilton S.S., S.C., air cluteh, late
113 ton No. 66 Bliss Consolidated S.S., tiered frame, DBG
106 ton No. 58 Toledo, S.S., S.G., tiered (three)
250 ton Williams & White 4 post hydraulic
150 ton HPM Hydro-Power Fastraverse, hydraulic
100 ton HPM Hydro-Power hydraulic
350 ton No. 19T Cleveland double action, toggle drawing, S.C.
260 ton No. 795½-72 Toledo double crank, toggle drawing
120/180 ton No. 174-S Toledo double action, toggle drawing, S.C.
200 ton No. 7 x 72" Bliss double crank s.s. tiered
126 ton Model 60D66 Cleveland s.s. double crank, tie-rod
600 ton No. 604 Toledo knuckle joint coining

Write For Your List No. 206

MILES MACHINERY CO.
PHONE SAGINAW PL 2-3105
2041 E. GENESEE AVE. SAGINAW, MICH.

REBUILT — GUARANTEED ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

Qu.	KW	Make	RPM	D.C. Volts	A.C. Volts
5	1500	Al.Ch.	514	250/700	13800/6900/4160
1	1500	G.E.	514	250	2300/4000
1	1450	Whse.	900	600	2300/4000
2	1250	Al.Ch.	720	600	2300/4000
1	850	G.E.	720	240/350	2300
1	725	Whse.	900	600	2300/4000
1	500	Cr.Wh.	720	600	2300/440
1	500	G.E.	900	250	2300
4	300	Whse.	1200	125/250	2300
1	300 (3-unit)	Al.Ch.	1200	250/300	2300
2	200	Whse.	1200	125/250	2300/440
2	150	Rel.	1200	125	2300/440
1	150	Whse.	1200	125/250	2300/440
1	150	G.E.	1200	250	4600/2300
1	100	Whse.	720	125/250	220
1	75	Whse.	1200	125/250	2300

2—400 KW, G.E. sealed Ignitron Mercury Arc Rectifiers complete with AC and DC switchgear and 475 KVA Pyranol Transf. 2400 V, 3 ph., 60 cycle.

DIRECT CURRENT MOTORS
230-Volt

Qu.	H.P.	Make	Type	R.P.M.
1**	1500	Whse.	Encl.	600
1**	700	Whse.	Encl.	143
1	700	Whse.	Encl.	300/700
2**	600	Whse.	Mill	300/1600
2	600	Whse.	QM	110/220
1	400	G.E.	MPC	450
1	300	Whse.	Mill	300/900
1	300	Whse.	Mill	300
2	275	Whse.	QM	425/850
1	200/250	El.Dy.	Ped. Brg.	400/1200
1	180	G.E.	MPC	400
1	175	G.E.	CD-175-A	850/1025
1	125	Whse.	SK-134	575/850
1	80	Rel.	651-T	575/1150
1	80	El.Dy.	2½-S	525/1050
1	60/75	Whse.	SK-151	250/1000
1	50	Whse.	SK	500/1500
1	50	Whse.	SK-141	250/1000
2	30/40	Whse.	SK-143	500/1500
1	35	Whse.	SK	250/1000
1	32½	Whse.	SK-150	400/1200
1	25	Whse.	SK-121	300/1200
2	15	Whse.	SK-93	575/1725
3	5/7½	Rel.	T.E.F.C.	337/1350

**—600 volts
All others—230 volts

T. B. MAC CABE COMPANY
4302 Clarissa St., Philadelphia 40, Penna.
Cable Address "Macsteel" Philadelphia, Pa. Phone Davenport 4-8300

2000# Chambersburg Pneumatic Forging Hammer Late Type, Serial 20CH392L7.
4000 lb. Chambersburg Double Frame Steam Forg. Hammer
2500 lb. Erie Single Leg Steam Forg. Hammer
No. 7 Ajax Forging Press, 700-ton capacity
3—2-ton Denison Auto. Hopper Feed & Index Table Hydr. Multipress
25 Transformer and Generating Arc Welders
2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944
6' x 10 ga. Cincinnati Squaring Shear
¼" x 8' P. & W. Gate Shear; 20" throat
4" National High Duty Upsetting & Forging Machine, air clutch, also one with regular clutch, also 1", 2", 3" air clutch
Williams White Bulldozers from 5-ton to 300-ton
Landis Landmaco and other Landis Threading Machines
Single & Double End Punches
No. 3 Motch & Merryweather Saw, with Saw Grinder
Conomatic, 8 Spin. Cap. 1⅝" Rd.
Conomatic, 4 Spin. Cap. 1½" Rd.

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

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1919 W. 74th Street, Chicago 36, Ill.

6' x 10 ga. Parker Power squaring shear, 1947, M.D.
No. ½, No. 1½ Buffalo Forge Univ. Ironworkers, Coper, Notcher, M.D.

FALK MACHINERY COMPANY
16 Ward St. Baker 5887 Rochester 5, N. Y.

BENNETT MACHINERY CO.
NEW BATH PRESS BRAKES
10' x ¼" No. 150-10, 150 ton, 12' bed
10' x 3/16" No. 120-10, 120 ton, 12' bed
10' x 8 ga No. 100-10, 100 ton, 12' bed
375 Allwood Rd., Clifton, New Jersey
Phone PRescott 9-8096 N. Y. Phone LOngacre 3-1222

MG Set GE 250KW 250VDC 720RPM 375HP 220V
Compressor 4000# Air 368'PD 150HP SYN MTR
Motor West CW 870RPM 2200V, Controls
Diesel Generator 60KW 250VDC Cummins/GE
Guillotine Bar Shear H&J #0 1½" Round Bar
Tube Bender 1¼" W&W Universal Hyd 15HP
Reduction Gear 150HP Fawcus 11.7:1 H Dty
F. H. CRAWFORD & COMPANY, INC.
30 Church Street New York 7, N. Y.

1—28" x 40" HOT STRIP MILL, 2-high, reversing, with 2500 HP D.C. motor, etc.
2—28" 3-HIGH ROLL STANDS with inlet, outlet and intermediate tables. Will produce 4" sq. billets from 8" sq. blooms in 6 passes. Includes bloom shear.
1—28" REVERSING BREAKDOWN MILL.
1—25" & 42" x 60" HOT STRIP MILL, 4-high.
1—28" PINION STAND, 2-high, modern design.
1—16" x 24" COLD MILL, 1 stand.
2—10" x 10" 2-HIGH COLD MILLS, combination pinion stand and gear set, extra forged steel rolls.
1—16" BAR MILL, 3-high, 4 stands, with speed reducer.
1—10" ROD MILL.
1—MECHANICAL COOLING BED for bars, 120 ft. long x 11'8" wide, shuffle bar type.
1—COIL BUILD-UP LINE. Capacity strip 36" max. width by .250" max. thickness.
1—34" x 192" ROLL GRINDER with motors and controls.
1—44" ROLL LATHE, enclosed headstock, tailstock, piano rest, 20 HP 500/1500 RPM, 230 volts D. C. motor and controls.
2—ROLLER LEVELERS, McKay, rolls 80" face & 5¼" dia., with gear box and universal spindles.
1—STRETCHER LEVELER for sheets, 500,000 lb. capacity.
1—KANE & ROACH BAR AND ANGLE STRAIGHTENER, size #5 cap. 4" x 4" x ½" angles, 5" channels 2½" bars.
2—KANE & ROACH BAR AND ANGLE STRAIGHTENERS, size #4, cap. 3" x 3" x 5/8" angles, 3½" channels and 2" bars.
1—LOCOMOTIVE, 62½ ton Diesel Electric.
2—UNITED HOT SAWS, 50", sliding frame.
1—BONNOT BILLETEER, size "A" cap. 3" to 6" Squares.
1—UNITED #4 BAR SHEAR vertical open side.
1—PELS BILLET AND BAR SHEAR cap. 7" round, 50 HP motor.
1—ALLIGATOR SHEAR, cap. 4" sq. or 5" rd. with 35 HP motor, blades 23½" long, weight 60,000 lbs.
1—ROTARY SIDE TRIMMING SHEAR, capacity 112" x ⅜" plate.
1—192" x 10 GAUGE NIAGARA SQUARING SHEAR, little used.
1—156" x ¼" SHEET SQUARING SHEAR.
1—SLITTING SHEAR FOR SHEETS, Mesta 92".
1—TANDEM SLITTING AND CUT-TO-LENGTH LINE, heavy duty, max. opening for 38" wide.
1—MORGAN INGOT STRIPPER CRANE, 50' span, 200 tons capacity, 230 volts D.C.
1—ALLIANCE LADLE CRANE, 4 girders, 80 ton main hoist, 25 ton auxiliary, 55'5" span, 42' lift.
1—CORRUGATING MACHINE, Stamco, for 12' wide sheets, including several sets of removable dies.
1—DRAWBENCH, Mesta, oil-hydraulic, for 3 strands of bars 20' long.
2—PICKLING MACHINES for sheets, Mesta.
1—SCRUBBER AND DRYER for sheets 66" wide.
2—PACK FURNACES for hot sheet mills, 62" x 60', double chamber.
1—66" GALVANIZING LINE for sheets, with 2 roller levelers.
1—3500 HP GEAR DRIVE, 514 to 80 RPM, 6.45 to 1 ratio.
1—2000 HP GEAR DRIVE, 200/580 RPM input, 4.44 to 1 ratio.
1—1600 HP GEAR DRIVE, 514 to 87 RPM, 5.9 to 1 ratio.
1—1200 HP GEAR DRIVE, 353 to 94.6 RPM, 3.73 to 1 ratio.
1—3500 HP MOTOR, 11000 volts, 3 phase, 60 cycle, 514 RPM.
1—1200 HP MOTOR, 2200 volts, 3 phase, 60 cycle, 353 RPM.
1—STEAM BOILER, 107 HP, 3700 LBS. per hour at 100 lbs., new 1950.

FRANK B. FOSTER, INC.

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RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT
DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
3	1375	G.E.	MCF	415	1000
1	1200	G.E.	MCF	600	450/600
1	940	Whse.	QM	250	140/170
1	800	Whse.		390	250/350
		With United Gear Set 7:1 Ratio			
8	450	Whse.		550	415
2	300	G.E.	MPC	230	400
1	250	G.E.	MPC	230	400/600
2	200	Whse.	CB-207.4	250	850/1200
1	150	G.E.	CD B.B.	600	250/700
1	150	Cr.Wh.	65-H	230	1150
1	125	Whse.	SK-185	230	350/1050
1	125	Whse.	SK-183	230	850
2	100	Whse.	SK-181	230	450/1000
1	60/100	G.E.	RF-17	230	450/900
2	75	Cr.Wh.	53 H TEFC	230	850
1	50	G.E.	MD-412-AE	230	550
6	40	Rel.	385F TEFC BB	230	500/1500
2	30/40	Whse.	SK-131.5-BB DP	250	500/1500
3	(unused) 30	G.E.	CDM-85 BB	230	2200

MG SETS — 3 Ph. 60 Cy.

Qu.	KW	Make	RPM	DC Volts	AC Volts
2	2000/2400	G.E.	450	250/300	2300/4000
1	2000	G.E.	500 25 cy.	600	11000
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
3	1000	G.E.	720	600	6600/13200
2	1000	G.E.	514	600	6600/13200
1	750	G.E.	720	125/250	2300/4600
1	500	Whse.	900	125/250	440
2	300	G.E.	1200	250	2300
2	300	Whse.	1200	275	440/2300
1	200	Whse.	1200	550	2300
1	200	G.E.	1200	250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	3000	A.C.	OISC	3	2300 x 2300
1	1500	G.E.	auto. HT	3	4000/4200/4400
3	1000	G.E.	HVDDJ	1	2400 x 480
3	1000	G.E.	OA/FA	1	13800 x 230/460
1	833	G.E.	H	1	13800 x 600
2	750	G.E.	Pyranol	1	4800 x 85/55
3	500	Kuhl.	OISC	1	13200 x 6600
1	500	G.E.	OISC	1	13200 x 2300
1	500	G.E.	HS	1	13800 x 600
1	300	G.E.	HT	3	4160 x 480/277
1	200	G.E.	Air/Cooled	3	4160/480 x 120/208Y
3	150	G.E.	OISC	3	22000 x 2300/4000Y
1	50 (unused)	G.E.	Askarel filled	3	13200 x 120/208Y

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47 Howell Street, Jersey City 6, N. J.

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NEW MOTORS AVAILABLE:
Over 5,000 new motors, in stock, from ¼HP to 200 HP.
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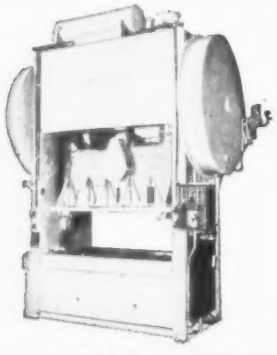

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TOTAL OF 17,500-KW IN M.G. SETS

5—3500-KW, 3 Unit, Allis-Chalmers, Motor Generator Sets. Each consisting of:
2—1750-KW, 250/350 Volts parallel, 500/700 Volts series, 514 RPM, 5000 Amp., type HCC, rated continuous at 40 Deg. C. Allis-Chalmers DC Generators with Class B Insulation, separately excited, direct connected in the center to:
1—5000-H, 3730-KW, 13800 Volts (6900 Volts), 3 Phase, 60 cycle, 514 RPM, 162 Amps., Allis-Chalmers, Synchronous Motor with Class B Insulation, rated continuous at 40 Deg. C. Rise.
Each set equipped with a 40-KW exciter for synchronous motor fields, and a 10-KW exciter for generator fields, both 250-VDC at 514 RPM.
All mounted on a structural steel base approximately 27' long x 11' wide.
These Units are of the very latest type and design—condition excellent—were used only a short time—AC and DC Switchgear available. For any additional information and price, please contact one of the following dealers closest to you:

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Moorhead Electrical Machinery Co.
120 Noblestown Road, Oakdale (Pittsburgh District), Pennsylvania
Brazes Engineering Co., Inc.
P. O. Box 9114, Houston, Texas
Duquesne Electric & Mfg. Co.
6428 Hamilton Avenue, Pittsburgh 6, Pa.

FOR SALE
Automatic Edge-WELDER
for welding tank heads in shells. Submerged arc unit, complete with flux recovery system and welding head. Will follow round, oval or obround shape automatically. Minimum radius 11". Mfd. by Morton Mfg. Co.

Like new. Priced to sell

Harlan & Hollingsworth Tank Corp.
225 S. 15th St., Phila., Pa.
Phone KI 6-4900

Used Steel Mill Equipment For Sale

1—Cupola, Manufactured by Morris Steel Products Co., 90" I.D. x 40' to top of stack, including vertical skip hoist charger, blower & accessories, mixing ladle.

1—Sheet Mill, consisting of the following equipment; 2 stands of 3-High hot mill, cold mill stands, Pack & Pair furnaces, Bell type furnaces, normalizing furnaces, shears, levelers, scales, complete with Terne tanks, tables, leveler, and all accessories, including electrical. Capacity 12,000 net tons per month of sheets.

1—Rod Mill, 14 stands of 10" dia. x 12" face bar & rod mill consisting of speed reducers, loopers, repeaters, coilers, 150 extra rolls, all accessories: no electrical equipment included.

1—15 ton Alliance O.E.T. Crane, 59'6" span, 3 motor, 230 volt D.C., cab operated, fishbelly girders.

1—"A" size Billeteer, Bonnott, capacity 3" square to 6" square, cutting length 6'-10' tables.

2—Cranes, 20 ton, Niles, 47' span, 3 motor, 230 volt D.C., cab operated.

1—Steel Frame Building, 70'6" wide x 760'-0" long, 50 ton crane runway, 67' span, 39'4" floor to bottom chord of truss, 29'4" floor to top of crane rail, bays are 20' long.

1—Crane, Cyclops, O.E.T., 55'5" span, cab operated 3/60/220 volt, A.C.

1—24" Model "S" Long & Allstatter Billet Shear, open end—capacity 6" rd.

4—Steel Frame Buildings, 50' wide x 325' long, with 10 ton crane runway, 46'7" span—18' floor to crane rail, 23' floor ot bottom chord, 1/8 pitch roof with monitor, bays are 25' long.

We fabricate top charge electric furnace Charging Buckets for any size electric melting furnace.

Lou F. Kinderman

P. O. BOX 182 NILES, OHIO OLympic 2-9876

eastern Rebuilt Machine Tools

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SURFACE GRINDERS
No. 16 Blanchard Rotary, m.d.
No. 16A-2 Blanchard Auto. Rotary, m.d.
No. 33 Abrasive, m.d.
14" Pratt & Whitney Vertical, m.d.
14" Pratt & Whitney Model M 1640 Vertical, m.d.
No. A-1—8" Arter Surface Grinder
No. 22—12" Heald Rotary, m.d.
No. 25-A—24" Heald Rotary, m.d.
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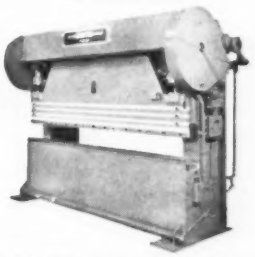

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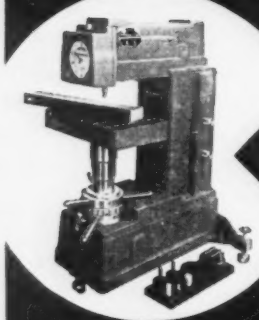

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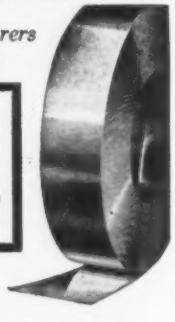

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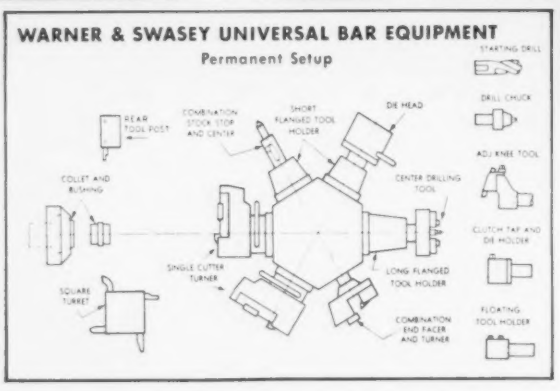

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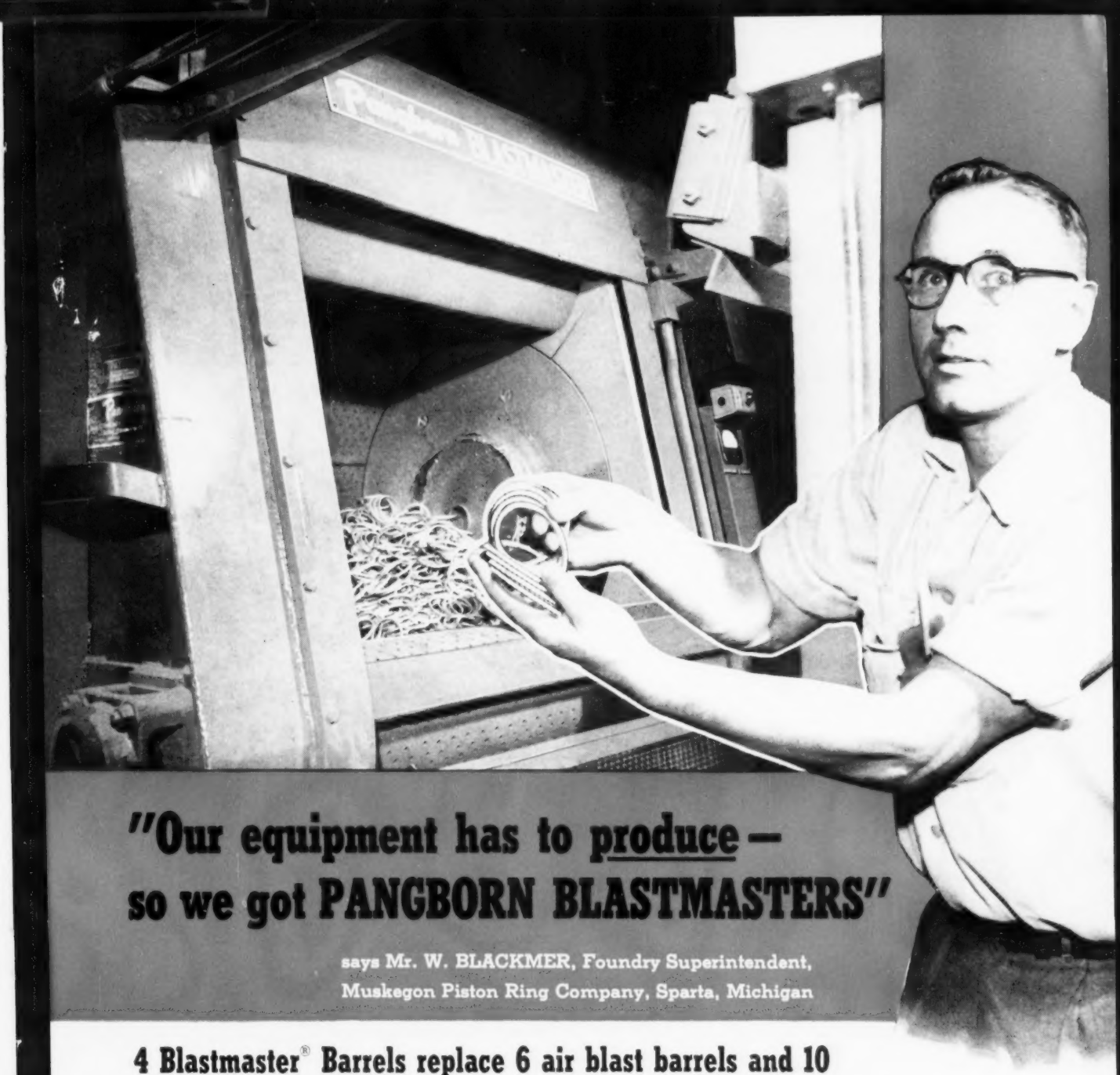

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